

# The Journal of Documentary Reproduction

DECEMBER • 1940

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Volume 3 • Number 4

A QUARTERLY REVIEW OF THE APPLICATION  
OF PHOTOGRAPHY AND ALLIED TECHNIQUES  
TO LIBRARY, MUSEUM AND ARCHIVAL SERVICE

# THE JOURNAL OF DOCUMENTARY REPRODUCTION

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## EDITOR

VERNON D. TATE, 808 Beverly Drive, Alexandria, Virginia

## ASSOCIATE EDITORS

RALPH H. CARRUTHERS, New York Public Library, New York

HERMAN H. FUSSLER, University of Chicago Libraries, Chicago

L. BENDIKSON, Huntington Library, San Marino, California

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# Photostat Reproductions of Valuable Source Material

L. BENDIKSON

APPEARS to be appropriate to mention once in a while, after all that is said in favor of microfilms, that there are certain instances in which the older process of photostat reproduction still has manifest advantages. Occasionally these become more obvious, especially when something can be done to lower the cost, which is their greatest drawback. The principal advantage of microfilm is the inexpensive way in which the micro-negative is made. When it comes to the printing of paper enlargements from the negatives, the difference between the cost of printing such enlargements and of photostat positives is greatly reduced. If several pages are printed on one sheet of photostat paper, it becomes doubtful which of the two is the cheaper. Hence, in all cases where a complete photostat negative reproduction of a certain work is available, positive prints can be obtained at very reasonable prices.

During the past 12 years the Huntington Library has reproduced, systematically, most of its unique and rare source material in historical and in literary fields. As the immediate result of this project, some 600 complete sets of photostat negatives are on file. From these positive copies have been printed for the library, and are now available on its open reference shelves for the purpose of limiting the use of costly originals. The indexed negatives are filed in a vault or "morgue," in the Department of Reproductions.

Two years ago it occurred to the direction that if the availability of these negatives was more generally known, and the fact that reduced cost positives of this collection of unique and rare works were obtainable, universities and colleges desiring copies on their reference shelves for textual study might be interested. The results have been most satisfying. During the first year reproductions aggregating 23,000 pages

have been requested, and during the second year 48,000 pages were ordered. The method of publicity followed was to issue at regular intervals lists, devoted to a certain subject or subdivision thereof, containing short title entries of available reproductions.

In this manner eight lists have been issued thus far, of which the first, introducing the experiment, was not confined to a specific subject and for this reason was discontinued. All others are still supplied on request. They are:

2. Western Americana
3. Shakespeare's Plays and Poems
4. Science and Medicine
5. Law
6. Early English Drama
7. Early English Music
8. Early English Poetry

These seven lists contain approximately 1200 different titles or about one third of the available Huntington Library photostats, and it is obvious from the response received on the issuance of the lists that others will follow in the course of time.

I believe that the success of this project is entirely due to the relatively small cost of most of the volumes. Of the 172 titles of the list of Early English Drama, about 50 per cent of all items cost less than six dollars, and of list no. 3 (a complete collection of all Shakespeare quartos), the price averages about seven dollars per volume. Use of the accumulated file of Huntington Library photostat negatives has been a decided service to many colleges, and at the same time it is a safeguard by which the texts of many unique documents, now preserved in several libraries dispersed over a large area, will not be lost, even if the originals do not survive the onslaught of turbulent events.

# University of Chicago Exhibition

M. LLEWELLYN RANEY

CHICAGO is fifty. Or thereabouts, according as the date of incorporation (September 10, 1890), induction of President (July 1, 1891), or start of instruction (October 1, 1892) is accounted the birthday. The University is playing safe and staging a year's celebration, with climax next September.

The intervening period is to be marked by a financial campaign and a standing series of exhibitions by the Departments of Art, Astronomy, Education, Geology, Medicine, New Testament, Physics, the Oriental Institute and the Libraries, joined by others at the finish.

Library materials go to the making of five displays—Bibles, Lincolniana, Maps, Microphotography, and Modern Poetry. On the opening day the Books in Miniature demonstration ran a close second in popular interest to Professor Compton's open air release of cosmic ray balloons, and that interest continues.

This exhibit, set up under floodlights in a first floor lobby of Harper Memorial Library, consists of nine wall panels, supplemented on the inaugural day by three reading machines, to which an operating camera is expected to be added in the final month.

The panels in order show:

1. Two Paris scenes—Dagron's Franco-Prussian War film service by carrier pigeons, and the A.L.A.-University of Chicago Libraries demonstration during the 1937 Exposition.
2. A placard listing fourteen applications of microphotography to scholarship, with newspaper illustration in detail.
3. Prints, both contact and projection, in considerable variety.
4. Special uses, including the recovery of lost texts through light beyond the visible spectrum, color work (illuminated), lantern slides, pictorial microphotography and publication—both by film, with or without printed abstracts, and microprint.

5. Photographs of numerous reading machines, accommodating records from bank checks to maps and newspapers.

6. Laboratory scenes—various cameras, the uniquely mechanized processor and printer, an enlarger unhappily not yet automatic, sample film and forms.

The remaining panels carry large scale pictures of three late instruments.

The University of Chicago established a Press almost at the outset. It begins its second half century with the most potent challenger of the printing press in its five hundred years. The Fourteen Points of that challenge may here go to record. It's a convenient corner.

1. TO GET MATERIAL OTHERWISE UNOBTAINABLE:

E.g., Mss., items rare, costly or out of print.

The British Sessional Papers for the 19th century can no longer be had in published form.

Film lightens the handicap of young institutions.

2. TO LESSEN THE HANDLING OF PRECIOUS ORIGINALS:

Facsimiles answer most purposes.

3. TO REPRODUCE IN COLOR OR NOT, AT PLEASURE:

The original may be copied exactly or reduced to clean black and white.

4. TO REPLACE THE PERISHING:

Notably newspaper files on wood pulp.

These valuable diaries are going to dust, but film is lasting and safe.

5. TO COMPLETE SPECIAL COLLECTIONS:

Not only by copying scarce items but by taking extracts from journals, etc. The whole literature of a subject may thus be united.

6. TO FACILITATE SCHOLARLY EXCHANGES:

Libraries may adopt differing specialties and serve outside scholars with copies while keeping the originals at home. Thus may the world's resources be mobilized at the competent hand.

7. TO RECOVER LOST TEXT:

E.g., from stains, censor, palimpsest or fire.

Filters and light beyond the visible spectrum are used for this purpose.

8. TO INVENTORY MUSEUM AND MAP COLLECTIONS:

The little picture is perfect identification.

9. TO MEDIATE THE MERGING OF CATALOGS:

The components are filmed quickly on the spot and transcribed from projection to make a union list.

o. TO IMPLEMENT CLASSROOM PROJECTS:

A short film replaces an armload of illustrative materials, and stays assembled.

1. TO SAVE SPACE:

A foot of film an inch wide holds from 8 to 32 pages in present practice. Or an octavo sheet of paper may carry at least 100 microprint pages. The saving is up to 98 per cent.

2. TO SUPERANNUATE LITTLE USED MATERIALS:

They remain available but take little room.

3. TO SAFEGUARD AGAINST LOSS:

American banks film  $2\frac{1}{2}$  billion checks a year, chiefly as protection against fraud; London, against bombs as well. Libraries can store cheap photographs of their irreplaceable treasures.

4. TO PUBLISH, IN SMALL EDITION OR SMALL COMPASS:

Filming makes possible an edition of one at the price of a printed copy from stock. Microprint, with 100 pages to a sheet, is feasible at 25 copies and phenomenally cheap in larger quantity. Press publications thus need never become unavailable.

# Cataloging Microfilms at the University of Michigan Library

MARGARET F. PARMELEE

OUR EXPERIENCE in cataloging microfilms at the University of Michigan began in 1937 with films of early English books. These were the first of a series based on titles in Pollard and Redgrave's *Short-Title Catalogue* made by Edwards Brothers of Ann Arbor, Michigan, who undertook to microfilm all available English books printed before 1550.<sup>1</sup> We decided that the rapidly growing collection would be most useful if fully cataloged. It seemed wasteful for each of the 11 libraries subscribing to the series to do all of the work itself, and desirable that one library should catalog the film for all the others. Although we had little experience in cataloging microfilms and little time to spare from cataloging books, it was decided to catalog the films as rapidly as possible, print the cards and sell them to any library desiring them. Thirty-four libraries are now buying cards, some taking only a single card and others entire sets with subjects and added entries. Catalogers and others who work with microfilm may be interested in some of our problems and some of the methods used to solve them.

In order to understand the problems and the attempted solutions, it is necessary to know something of the microfilms with which we had to deal. Readers already familiar with them should ignore this description, which of necessity must be detailed. The films, which are of standard 35mm. width, are positives from negatives made in the British Museum and other English libraries. In the first shipment there was a single title on a roll and each roll was in a pill box style of container with the author's name and the title on the cover. Later films are in rolls of about 100 feet with from 1 to 45 titles on each roll, the number depending upon the length of the works. Each roll is in a

<sup>1</sup>Since July 1938, the firm, University Microfilms, which acquired the microfilm business of Edwards Brothers, has been issuing the series. Subscribers have agreed to an extension of the date limit to 1600.

all box, which the publisher designates in his catalog as a carton, and six of these cartons come together in a buckram case. The cartons are numbered consecutively throughout the collection. The titles are arranged on each roll numerically according to the order number which the publisher assigns to each title. There is no plan or order in the sequence of titles because the books had to be photographed as they were available, and they were not usually available either in chronological order or in the alphabetical order of the *Short-Title Catalogue*. Sometimes the numbers on the rolls are not consecutive. Preceding each title on the film is photographed a label which usually gives the author, brief title, date, location of the original with its call number, the *Short-Title Catalogue* number and the order number. With the first page of most of the books is photographed a scale in centimeters and inches, which shows the ratio between the size of the original book and the image on the screen. With each case University Microfilms supplies a catalog which lists by order number the titles on the six rolls contained therein, and gives for each the number, author and title from the *Short-Title Catalogue*, and for some the location and call number of the original. University Microfilms also issues for each year a Cross Index, which is a "numerical listing" by *Short-Title Catalogue* number "giving film and case number." Such were the films with which we had to work.

Before proceeding to the details of cataloging, perhaps I should say something about the storage of our films. We keep them on the fourth floor of the Library in a room equipped with reading machines, where readers work under the supervision of the assistants in the Graduate Reading Room for History and Political Science, which is next door. The duplicate catalog which we are making for the films is in the Graduate Reading Room. No attempt is made at a classed arrangement of our film collection. We keep the Early English series together in the order of issue. At first we left the rolls in the cases in which they came, but recently when moving them into a new air conditioned cabinet were obliged to take them out of the cases. However, we still have them in small cartons. Arrangement of the titles in the series according to classification would require cutting up the films so that there would be a single title on a strip of film. The films would be

easier to use in this form, but the division would make a great deal of extra work and require much more storage space. Although the films are not arranged by class, a number in the Library of Congress Classification is assigned to each title and a card for it is placed in our shelf list, which is sometimes used as a classed catalog. The call number is not placed on the rest of the set of cards, instead the word "Film" appears in the upper left hand corner. Below "Film" is stamped "Inquire in Graduate Reading Room 4" to direct the reader to the room where the films are kept. In addition to the Early English series our film collection includes the microfilm edition of the *New York Times*, the *Chicago Daily Tribune* and the *Detroit News*, theses and miscellaneous works. The arrangement of these has not yet become a problem, and since they are mostly uncataloged, it is not necessary to include them in this discussion.

After this consideration of the form, storage and arrangement of the microfilms, we can proceed to the actual cataloging. This is done in the Catalog Department where there is a reading machine. This arrangement saves much time, since the cataloger constantly needs to consult the Library of Congress Depository Catalog, the British Museum Catalogue and other reference tools in the Department. In

**FILM**

Inquire in

Graduate R. R. 4

Guevara, Antonio de, d. 1545?

The golden booke of Marcvs Avrellius Emperour  
and eloquente oratour. Londini, an.M.D.XLVI.

Film reproduction, position 3.

Colophon: Imprinted at London in Fletestrete, in the  
house of Thomas Berthelet ...

Translated by Lord Berners from a French version.

University microfilms no. 1267 (case 8, carton 47)

Short-title catalogue no. 12440.

1. Education of princes. 2. Aurelius Antoninus, Marcus,  
emperor of Rome, 121-180. I. Berners, John Bouchier, 2d  
baron, 1467-1533, tr. II. Title.

M1U F40-125

FIG. 1.—Catalog card

cataloging we follow the principles laid down by a group of our staff members especially concerned with the care of microfilms. After a conference of this group sample cards were sent to subscribers to the *Microfilm Review*, who were prospective buyers of cards, for their comments and suggestions. The replies showed, as do articles written on the subject, that no two persons agree on just what is an adequate description of a microfilm. We are not sure ourselves. Some of the suggestions were incorporated and the present card is the result. In it we depart as little as possible from the procedure for books, with some exceptions. For the entry we follow the Library of Congress entry when there is one and it can be found. The works are often without title pages and sometimes are only fragments consisting of one leaf or a few scattered leaves. Where there is no Library of Congress entry we search bibliographies and biographies to establish an entry, using as much information as in cataloging books. Anonymous works which require form numbers present particular problems, for often it is difficult to find a commonly accepted entry. When authorities differ widely, we usually prefer to enter under the title and let subscribers supply for themselves the form they choose. Always in trying to identify various editions of microfilms there is the disadvantage of being unable to compare them side by side as we compare books. For the title we follow the title page in cataloging books. It is often difficult to transcribe the words with their indistinct letters and antique spelling, for the film is even less easy to read than the original would be. We have no type for abbreviations and old forms of letters and have to draw them as best we can. The imprint of the original, but not that of the film itself, is used. This is unlike our practice in cataloging facsimiles of books, for which both the imprint of the original and that of the facsimile are given. However, for the films the publisher is named on each card in the note which gives his order number for the work, and the full information is given on the cover of the publisher's catalog.

After the imprint, the next item on the card would normally be the collation, but we omit it. This omission has saved the cataloger much distress, for the original works often have no foliation or pagination, and many of them are incomplete or fragmentary. Moreover, it is usually impossible to find the collation except for incunabula, which

master bibliographers have already described with meticulous care. We do state in a note the fact that a work consists of a single leaf, but do not usually note imperfections, missing title pages, cite authority for supplied titles, indicate the length of the film in frames, as sometimes done in descriptions of films, mention illustrations, or give either the size of the original or the width of the film. The curious reader may calculate the size of the original from the scale photographed with the book. The width of the film is the standard 35mm. For the first note we use "Film reproduction" to call attention at once to the fact that we are describing a film. We had considerable discussion about how to give the film cards a distinguishing mark, but finally decided that this note and the word "Film" in the corner of the card should be enough. The position number, which follows the phrase "Film reproduction" refers to the placement of the text on the film.<sup>2</sup> Now, since reading machines are adjustable both to films with lines running parallel to the edge and to those with lines running across, this note is of doubtful value. At first, in our desire to be brief, we did not give the colophon, but on later cards we have been giving it when it furnishes information not found on the title page. It often helps identify editions that have similar or identical titles, in addition to giving the authority for the imprint. Next appear the essential bibliographical notes, such as those on editor or translator, then the publisher's order number, followed by the number of the case and carton, and finally, at the end, the *Short-Title Catalogue* number. Subject and added entry tracings are printed at the bottom of the card. An entry is made for the printer of each work in the special file of printers kept in the Catalog Department, but the tracings for these, as for the classification numbers of the microfilms, are made only on the back of the main official card.

We know that there are some other items that might be useful to occasional readers. It is not specified whether the films are positives or negatives, since they are all positives. The location of the original copy might be useful, but may be found on the film itself. In cataloging

<sup>2</sup>For an explanation of positions and position numbers see *Manual on Methods of Reproducing Research Materials; a Survey Made for the Joint Committee on Materials for Research of the Social Science Research Council and the American Council of Learned Societies*, by Robert C. Binkley, 1936, p.145.

new films not included in the series additional information has been furnished. For instance, in cataloging *Freedom's Journal* the location of the original was indicated; in cataloging a thesis the paging was given. Of the 96 rolls received 61 or about 1000 titles have been cataloged. Aside from the fact that we do not give collation, the films are as difficult to catalog as the original old books would be, and since we have had no additional help in doing the work, it has been impossible to keep up to date in cataloging the collection. Our cards are photoprinted as are the cards for books, but there is a special series number for the film cards in which "F" for film precedes the card number.

This article is in no sense written to advertise our cards, for we do not make them for profit. Frankly we are experimenting in cataloging microfilms, and do not hold up these cards as a pattern for other libraries, or even for ourselves. As microfilms, reading machines and terminology change, so must our cataloging.

# A Microfilm Survey

XENOPHON P. SMITH

DURING the months of March and April of 1940 a survey was conducted by the writer on the subject, "Audio-visual Aids in the Library." A questionnaire containing thirty main parts designed to cover the whole field under investigation was used. One of the parts was on the subject of microfilms.

For this survey a total of 402 questionnaires were sent out; 150 went to public libraries large and small; 80 to college and university libraries where the enrollment exceeds 2500 students; 47 to small college libraries with less than 1000 students; 55 to state libraries and library commissions; 49 to high school libraries in city school systems; and 21 to library schools. The results in the final report consider only the first four of these groups. Replies were received from 57 per cent of the entire group solicited. These replies were geographically distributed in close proximity to the population density of the country and all states except Nevada and North Dakota were represented.

A summary of most of the general findings in this study is being published elsewhere but it was thought that the section concerning microfilms should be reported in these pages; the following is a verbatim copy of that part of the original report.<sup>1</sup>

## *Part XI*

### MICROFILMS

Seldom do things catch on as quickly as microfilms have. Turn back the pages of the periodical indexes a mere five or six years and the word is not even used. But in these intervening years there has sprung up a completely new tool and a rather sizable industry.

<sup>1</sup>While the material of this report is, of course, copyrighted, until it is available in more popular form, a thesis file copy is obtainable on interlibrary loan from Oregon State College Library.

Question 13 was designed to find out many things concerning this new visual aid besides the extent of its present and probable future use. A careful comparison of the figures for different types of libraries will prove most interesting and enlightening. The table and excerpts should also dispel any false notions about the present condition of affairs in this field.

TABLE 11  
MICROFILMS

|                           | <i>Public</i> | <i>C. and U.</i> | <i>S. C.</i> | <i>State</i> |
|---------------------------|---------------|------------------|--------------|--------------|
| Past use                  |               |                  |              |              |
| None                      | 51            | 11               | 14           | 12           |
| Some                      | 8             | 27               | 3            | —            |
| Extensive                 | —             | 1                | —            | —            |
| Present use               |               |                  |              |              |
| None                      | 45            | 6                | 15           | 14           |
| Some                      | 11            | 33               | 5            | 1            |
| Extensive                 | 2             | 3                | —            | —            |
| Future use                |               |                  |              |              |
| None                      | 22            | —                | 7            | 6            |
| Some                      | 11            | 17               | 5            | 2            |
| Extensive                 | 12            | 16               | 5            | 1            |
| Subscriptions on film     |               |                  |              |              |
| Yes                       | 8             | 10               | 2            | —            |
| No                        | 19            | 27               | 12           | 8            |
| Kept on long rolls        | 3             | 12               | 3            | 1            |
| Kept on individual strips | 4             | 18               | 3            | —            |
| Cataloged the same        | 5             | 15               | 2            | —            |
| Special cataloging        | 1             | 7                | 2            | —            |
| Microprints               |               |                  |              |              |
| Desirable                 | 2             | 12               | 3            | —            |
| Not desirable             | 6             | 8                | 2            | —            |
| Reading machines owned    | 15            | 31               | 4            | 1            |
| Equipped for copying      | 1             | 8                | 1            | 1            |
| Technique satisfactory    |               |                  |              |              |
| Yes                       | 8             | 18               | 6            | 2            |
| No                        | 6             | 16               | 1            | —            |
| No report                 | 21            | 2                | 3            | 6            |

### QUESTION 13

#### Microfilms

Past use.....None ( ) Some ( ) Extensive ( )

Present use.....None ( ) Some ( ) Extensive ( )

Future use.....None ( ) Some ( ) Extensive ( )

Are any of your current subscriptions coming on microfilm—Yes ( )

No ( )

Do you handle separate articles together on long rolls ( ) or separately on individual strips ( )

Are you cataloging microfilm the same as other material ( ) or have you a special method of handling it ( )

Approximately what per cent of your interlibrary loans are handled by microfilm now ( )

What is your impression of microprints in pamphlet form as suggested recently—would they be desirable—Yes ( ) No ( )

Does library own desk-type binocular viewers—Yes ( ) No ( )

Would such an instrument be desirable—Yes ( ) No ( )

Does library own reading machines—Yes ( ) No ( ) How many ( )

Does library own copying equipment for service—Yes ( ) No ( )

Do you consider microfilm techniques satisfactory at present ( ) or does there need to be decided improvement to bring them to that point ( )

Remarks:

#### EXCERPTS

"We expect to subscribe to microfilm edition of the New York Times as soon as a good projector at a reasonable price is available."

"Microprints' desirable only in a limited number of cases for special material"

"More eye comfort for reader is essential"

"Only 1% of interlibrary loans on film."

"We rent Recordak Junior for copying. 5% of loans are on film now. Techniques are reasonably satisfactory but there will be improvement and reduction in cost, of course."

"Expect to make use of these in near future."

"When equipment is less expensive and complicated hope to microfilm newspapers and be able to borrow microfilm for research study from other libraries."

"Very few interlibrary loans on microfilm now."

"Fifty percent of loans on film now."

"Five percent of interlibrary loans on films now."

"Have secured funds and expect to buy equipment soon."

"Still room for improvement in techniques and for cheaper readers."

"In stating that present microfilm techniques are satisfactory I do not at all preclude further development or new techniques. It is possible that the prospective development of flat film may be very superior to present methods and rapidly outmode them."

"Have subscribed for New York Times microfilm edition beginning January 1940. As yet we have no projector. Have been promised gift of scientific (chemical) journals in microfilm when we get a projector."

"Library will purchase reader and camera within next 6 months."

"Cataloging the same as books but with special shelf list. 10% of loans on film. Microprints are doubtful. Techniques are bound to improve."

"Expect to have film laboratory in near future. Have made 35,000 feet of 8mm negative of historical manuscripts in field."

"Nine percent of incoming interlibrary loans on film."

"I am personally much interested in microfilms but we haven't come to the 'sticking point' yet."

"None of loans on film."

"Our cataloging policies are now being evolved. Reading machines not perfect yet."

"Twenty percent of loans on film."

"Loans—1938—2.38%; 1939—0.66%. Binocular viewer would be desirable with large collection of films. Believe microfilms have established their place in library service and definite development should be made."

"None of loans. We ask the person to order direct."

"Copying equipment on order."

"Use will increase greatly. Users find films not always in focus."

"Satisfactory but improvement desirable."

"The — Journal (old issues—60 years) has been microfilmed under WPA project for the library. Since the machine and the film are just being transferred to the building, we have no actual experience with its use. In all probability the current issues will be filmed and the New York Times film edition ordered."

"Cataloging problem now under consideration. Fifty percent of loans on film. In new library (1940) a complete microfilm room and darkroom has been constructed with facilities for copying and developing. Four reading machines are also being added."

"Cataloging method not yet decided. Percent of loans small."

"None owned or expected by us."

"Improvement needed; also special facilities for shelving."

#### COMMENTS

None of the 30 questions in the survey brought forth as many remarks as did this one. Consequently there is so much to comment on it is difficult to select the most important.

Probably the outstanding point in the figures of the table is the indication that this is definitely considered as more useful to the college and university libraries than to the public or state libraries. Whereas 16% of the public libraries and only 1 of the state libraries report present use, over 70% of the

college and university group are using microfilm today. While the public libraries increase to almost 27% of them indicating future use, the college and university group remains at 65% with not a single library among them bold enough or rash enough to predict no future use. There are many reasons for this which need not be discussed here.

With all of the activity in the different groups, it is interesting to note under the next figures of the table that only some 20% of all libraries reporting have present subscriptions coming on film. No doubt this will change materially in the next few years, but some of the remarks indicate that it may not unless drastic changes are made in techniques or equipment or both. The combination of difficulties involved in the use of the New York Times film edition today is sufficient to dampen anyone's enthusiasm. When the day arrives on which we can hand the reader one single day's issue of the paper which he can handle and read in a machine as conveniently as he does any regular paper there will be real reason for its widespread adoption. Until some of the studies now being made have accomplished this objective, there will probably be very gradual change from conditions as they are now.

As to the manner of handling films, the remarks indicate many methods. Long rolls seem suited to material if it is all on one subject but most inconvenient if films on many subjects are included. Short strips seem more feasible for scientific articles and material of that type.

One excellent way to handle these shorter strips is on 5x8 cards with the assistance of the glassene strips used by stamp collectors in their albums. Full information concerning the article can be typed or written on the card before the strip or strips are glued in place. By overlapping the container strips three or four or even more of the filmstrips almost 8" in length can be handled in a scratchless individual cover on one single card. Until the flat film mentioned in one of the excerpts has eventuated from one of the developmental studies now being made, perhaps this is the best method of handling these short lengths of film.

Closely allied to the problem of the short strips is the matter of the binocular viewer which appears in the question but not in the table. Again it is significant that twice as many of the college and university libraries as of any other group stated such an instrument would be desirable. Dealing as they are with the short strips containing scientific or technical articles they want some more efficient method of handling them than is available at present. Some optical manufacturer should tackle the problem immediately of a ten or twelve times magnification through the use of a comfortably de-

ned binocular arrangement. Such an instrument if brought out at a reasonable price would meet with almost instant success. Except for long periods of continuous reading, such as a book or extremely long articles, this type of equipment will prove far more desirable than the present complicated reading machines.

In the matter of equipment for doing the work of making microfilm copies it seems that progress is discouragingly slow. Only one library in each of the public, small college, and state library groups reported possession of equipment to do this work. The college and university group is much better along, but even the report they give shows only 15% of them so equipped. Certainly in the face of this report on copying equipment we cannot look for much progress in the field of interlibrary loans. And the reports do not show much. Except for two isolated cases reporting loans of 50% on film, the next highest was one at 20%. But the average was well below 5% and probably if it could be accurately determined would run in the neighborhood of about 2%.

What has caused this newest of visual aids, which the library world has accepted with such wide open arms, to bog down in this manner? There are many reasons, but they can all be summed up in one statement. The present techniques and equipment are not thoroughly adapted to library needs. Therefore until definite results are achieved in designing equipment and improving techniques with the libraries' needs as the starting point, we can expect a continuance of the present policy of wishful waiting. When this work is done and the proper equipment produced, the forward surge will sweep all before it. For as one librarian has remarked above, "... microforms have established their place in library service and definite development could be made."

# Policy with Regard to Reproduction of Library Materials

IN THE FALL of 1940 a memorandum entitled "Proposed Statement of Policy with Regard to Reproduction of Library Materials" was circulated among several libraries and institutions. The communication is an outgrowth of previous attempts to formulate an equitable and mutually satisfactory policy of fair use and reproduction of library materials. (See: The Gentlemen's Agreement and the Problem of Copyright in the JOURNAL, vol. 2, p.29-36.) Numerous comments and suggestions were received, and the memorandum was submitted at the December 1940 meeting of the American Library Association to the Council of the American Library Association, and also to the Association of Research Libraries. Both approved the statement as reproduced herewith. The code as approved is not necessarily final and will probably require revision and interpretation from time to time. It is printed in outline form as submitted.—EDITOR.

I. NON-COPYRIGHT MATERIAL (Published works not copyrighted in the United States, or on which copyright has expired).

a) *Out-of-Print*. There appear to be no legal or ethical reasons for any restrictions on library reproduction of such materials, either for use within the institution or for sale.

b) *In Print*. There are no legal restrictions on reproduction of such materials, whether of foreign or domestic origin. In the case of periodicals which have not been copyrighted in the United States, however, it is evident that it would not be in the best interests of scholarship to engage in widespread reproduction which would deprive the publisher of income to which he appears to be entitled and might result in suspension of the publication. It is recommended, therefore, that before reproducing uncopyrighted material less than twenty years old, either for sale or for use within the library, libraries should ascertain whether or not the publication is still in print and, if it is in print, should refrain from reproducing whole numbers

or volumes or series of volumes. This recommendation does not apply to reproduction of individual articles or extracts which are to be reproduced without profit.

## II. COPYRIGHT MATERIAL

a) *Out-of-Print*. This material enjoys the complete protection of the Copyright Law but the courts recognize that "fair use," which includes reasonable copying, may be made of copyright material. The final determination as to whether any act of copying is a "fair use" rests with the courts. But the practical and customary meaning of "fair use" applicable to reproduction for research purposes was agreed upon in 1935 by the National Association of Book Publishers and the Joint Committee on Materials for Research. The Book Publishers Bureau, which now exercises the functions of the old Association, has acknowledged the agreement. The agreement recognizes the right of a library to make and deliver a single photographic reproduction of a part of a book or periodical volume in which copyright still subsists to a scholar who represents in writing that he desires such reproduction in lieu of loan of such publication or in place of manual transcription and solely for purposes of research. The agreement requires (1) that the library give to the person receiving the reproduction due notice in writing that he is not exempt from liability to the copyright proprietor for any infringement of copyright by misuse of the reproduction and (2) that the library furnish such reproduction without profit to itself. It is recommended that, in all cases which do not clearly come within the scope of the agreement, either the scholar requiring the reproduction or the library to which the request is made seek the permission of the copyright owner before reproducing copyright material. Special care is called for in the case of illustrations or articles that are covered by a special copyright in addition to the general copyright on the whole book or periodical. Attention is called to the fact that a publisher's permission is not legal protection to the library unless the publisher is either the copyright owner or an agent of the owner duly authorized to grant such permission.

b) *In Print*. Legally there is no distinction between in print and out-of-print copyright material. Reproduction of in print material, however, is more likely to bring financial harm to the owner of the copyright, and it is recommended that libraries be even more careful than in the case of out-of-print material.

## III. MANUSCRIPTS

Manuscript material is protected by common law and the restrictions on its reproduction are probably less rigid than those on copyright material. Reproduction may probably be made to assist genuine

scholarly research if no publication is involved. Libraries should however, be careful to observe any restrictions of copying such material that have been stipulated by the donor.

It is recommended that when acquiring manuscripts libraries seek a definite understanding regarding the publication rights, since, in manuscripts, the literary property, as distinct from the physical property, usually belongs to the author or his heirs. It is further recommended that, when consent to publication is given by the donor, evidence be secured that he has actually acquired the literary property or is authorized to act for the owner of the literary property.

# Microphotography with a Rolleicord Camera

— JOHN T. WORTH

FINDING a camera that will microcopy short runs of material quickly and with a minimum of effort and operating technique is a serious problem to the small institution and the individual scholar. Most of the hand operated cameras require special focusing devices to enable their adaptation to microphotography. These devices are extremely efficient in the hands of a person well versed in photographic principles and who constantly uses the equipment, but they are complicated for the occasional user.

Elimination of these special focusing devices may be accomplished by the use of a camera with a ground glass. The cameras now on the market providing ground glass focusing have certain disadvantages for microcopying. They use larger size film than the 35mm. that is becoming standardized for most types of microfilming, and special lenses for close-ups are not part of the standard accessories made for the camera. The use of larger film requires special apparatus and increases cost; the lack of close-up lenses prevents the use of the camera in many types of microcopying.

We have been using a hand camera, the Rolleicord II, that has a ground glass for focusing, and that does have supplementary lenses for microcopying. The camera is intended to make  $2\frac{1}{4} \times 2\frac{1}{4}$  negatives on  $2\frac{1}{4} \times 3\frac{1}{2}$  film. As an accessory, the makers of this camera sell a 35mm. adapter back, enabling this camera to be used for microphotography.

For the past year our Rolleicord has seen hard service, not only in microfilming, but in other specialized fields, such as photomicrography, nature studies, museum objects, murals, and the more general phases of picture making. Its ease of operation, adaptability to all types of photography, and the accuracy of its lens and shutter make it a camera that should be more fully investigated by all who have a need for

specialized photography, and especially those who are interested in limited amounts of microfilming.

There are several Rolleicord models on the market. All have similarities in their general construction, but each varies in some of its details. The considerations that determined our purchase of the Rolleicord model II were the incorporation of the most necessary features and the cheaper price.

The camera has a twin lens system—one lens mounted above the other. The upper lens is the finder. Behind the finding lens is a mirror that reflects the image upward to a ground glass at the top of the camera. The lower lens takes the picture. It is a Zeiss Triotar f.3.5, 75mm. lens. It gives us excellent results under all of the conditions that we have used it. The two lenses are correlated for their vertical displacement, so that parallax is automatically compensated. The camera will focus from 31 inches to infinity.

The upper lens is a 3.2 Triotar that gives intense illumination to the ground glass. A reflex camera with a single lens for focusing and taking pictures requires first opening the aperture so that the image may be clearly seen and then stopping down so that the correct depth of focus is achieved.

Not merely the lenses but the entire front of the camera moves forward and back when focusing. The shutter speed and lens stop indicators are conveniently located so that they may be seen when focusing through the ground glass without change in the operator's position in regard to the camera's.

The ground glass is located at the top of the camera, so that the subject matter may be seen when looking down. A folding metal hood protects the ground glass and shields the image from glare. The hood operates easily, requiring only one finger either to open or close. A magnifying glass that may be swung in or out of position is mounted in the hood. It aids in obtaining critical focus, and eliminates to a great extent out-of-focus pictures resulting from operators with poor eyesight.

The shutter is a one lever Compur with speeds to  $1/300$  of a second. An opening for a cable release is provided which avoids the possibility of any jar at the time of exposure resulting from direct manipulation of the lever.

The adapter back for the 35mm. roll film was purchased with the camera. It consists of an "L" shaped panel that fits on the back and bottom of the camera, replacing the regular panel. An indicator for the number of exposures is built in the back of this panel. Included is a film track and screen that guides the film across the center of the negative area; a screen mask that fits on the ground glass reducing the size of the view image to a 35mm. double frame; a spool holder and take-up spool for 35mm. film, and rewind and release knobs.

The screen mask that fits on the ground glass is smaller than the negative. When copying small pages it is necessary to enlarge the openings of the screen mask to the regular negative size in order to utilize the film area fully and to prevent the inclusion of matter that is not desired in the picture.

One adapter back for a Rolleicord camera that I saw was better than the manufacturer's model. It permitted the use of imperforate, single and double perforate 35mm. film by making minor adjustments. It was home made, but of excellent construction. The take-up spool pulls each frame into position, and by using a friction counter instead of a sprocket, it is possible to use the various types of 35mm. film.

The use of supplementary devices to permit a focus nearer to the object than the 31 inch limit of the lens is necessary when micro-filming. As the lenses of the Rolleicord are permanently mounted, extension tubes can not be used. Supplementary lenses may be obtained that increase the focusing range from 31 to 13 inches. These lenses, known as Proxars, come in matched sets with a separate lens for both finding and taking camera lenses. Proxar set No. 1 increases the range from 31 to 20 inches, while set No. 2 permits a focus from 20 to 13 inches. It is also necessary to obtain the Rolleipar lenses No. 1 and No. 2 to match the Proxar lenses No. 1 and No. 2. These Rolleipar lenses are used on the finding lens so that the ground glass image is correlated as to focus, and as to the composition of the negative picture. These attachments and the filters use a bayonet type mount on the finding lens and a push on type on the viewing lens and are easily put on or taken off. A change from one close-up set to another is made quickly, and the lens shade may be used or removed without disturbing any of the adjustments or altering the focus.

The chief advantage of the Rolleicord for microphotography as compared to other hand cameras is the ease with which focusing may be done. There is no uncertainty on the part of the operator. He sees the picture before, during, and after the shutter is operated. He can note the focus and composition of the picture with one glance. This saves time in the operation, and by aiding in the prevention of errors, saves additional time in eliminating retakes. Composition is definitely known, which is extremely important when photographing several small objects at once, as for example different sized documents, or objects that need to be exactly centered in the picture.



FIG. 1.—Rolleicord Camera on Tripod Stand.

Another advantage is the ease with which the camera may be set up for microphotography. The base of the camera has a standard size screw hole for a tripod mount. We alternate the camera mount, depending upon subject matter and the other work going on, between a metal tripod with collapsible leg (Fig. 1) and a tilt-top head, the

stman Precision Enlarger stand, or our Graflex Photorecord stand. Any mount that is solid is suitable, but for copy work that requires high reduction ratios, the camera should be mounted to the wall. By raising and lowering the camera and turning the focusing knob, documents of varying sizes can be filmed without making major adjustments.

When focusing the camera the plane of the negative must be parallel with the plane of the subject matter. We have found that when this is not done there is appreciable distortion in the negative. To achieve parallelism, the support must be rigid, but easily adjusted.

The shutter speed and lens stop can be determined from the same position that the ground glass image is viewed. This makes possible frequent check ups with an exposure meter, and necessary corrections can be made. Without special apparatus for light control, frequent check ups are necessary. Variations in current and in lights as they burn will cause the negatives to be uneven in density and contrast.

We have used different types of lights. The No. 2 Photofloods are satisfactory for a hand camera, but it is advisable to turn them off when not in actual use so as to protect the operator's eyes and to save current and bulb replacement. Aluminum clamp-on reflectors are the most portable, but where the camera will be used in one place only, more permanent installations may be made.

If the camera is to be used for other purposes than microfilming, the  $2\frac{1}{4} \times 2\frac{1}{4}$  film that is standard for the camera is sometimes an advantage. A special plate adapter back may be purchased as a standard accessory, so that single pictures may be taken and processed at once.

We have found this camera to be extremely adaptable. With it we have photographed 10,000 pages of printed matter in short runs during the past year. We have also made 1,200 Kodachrome slides of our butterfly specimens, birds and plants. The camera has been used for photomicrographs, landscape murals, and with a flash gun for action pictures at night, beside the usual photographic uses of a camera. Our results have been extremely pleasing to us.

The camera has the distinct advantage of being easily focused when it is used for microfilming. The construction is highly accurate and sturdy. The simpler operations involved in its use will appeal to the occasional user.

# Microfilming Experiences in Mexico

CHESTER L. GUTHRIE

FOR A STUDENT without any previous experience, the prospect of copying thousands of old documents in a foreign land is enough to cause misgivings. When in addition there are factors of limited time, slender resources, and the usual researcher's vagueness as to whether pertinent documents really do exist in sufficient quantities, the consideration of an expedition turns misgivings almost into panic. To some degree that was precisely the state of mind of the writer when he headed his car toward Mexico several months ago. Material for a descriptive history of seventeenth century Mexico City was the objective of the trip. From a previous journey, the logical location of the proper documents was known, but the writer had no experience with the photographic technique of research, and had made but little use of the candid type of camera for any purpose. Furthermore, the work was to be done in a number of repositories with important data widely scattered in many collections. Under such conditions, considerable thought had to be given to clerical and mechanical methodology.

The equipment used consisted of a Leica camera, camera holding arm, sliding-focusing copy attachment, number one supplementary front lens, exposure meter, two gooseneck desk lamps, a handmade standard, a "Daylight Bulk Film Winder," ordinary empty cartridges, and 35mm. positive film.

It was decided to photograph two pages to a frame in order to save time and expense; hence, a field averaging about 14" x 21" in size had to be copied with clarity of detail sufficient to allow the difficult script of the period to be read. Also, because of the scattered nature of the material, it was necessary constantly to change the citations. This fact would ordinarily have necessitated a great deal of clerical work and film indexing; so a method differing somewhat from the usual note-

book and old calendar numeral system was devised. Slips of paper 3" x 5" in size, which could have been larger if the author so desired, were used as notes in finding data. Each slip was headed in the usual manner, giving citation, subject, title and date, and a space was left at the top for adding the serial number for the roll and frame. The whole was photographed with the document, after the appropriate roll and frame numbers had been written in. The result was an automatic index, which served as summary notes to the documents, and at the same time identified the frame absolutely without the need for counting from the beginning of each roll. It was found, however, that only five to ten frames should be noted on one slip, so that occasional mechanical errors could be more easily corrected. In spite of the extra slips, it was found that the burden of note-taking never became exhausting.

A major problem was the photographing of two pages to each exposure with sufficient precision to produce legible results. In the first place, vibration had to be contended with, for Mexico City is built upon lake bed far above bed rock, and the buildings are very old. Street-cars and trucks outside, as well as people walking inside, add to the mechanical worries. It was found that it was useless to wait for the camera to become still; consequently, it was necessary to reinforce the standard with wood and leather, and to mount the mechanism on rubber sponges. Wire and heavy cord bracing was tried first because of the ease with which those materials could be applied; but both acted as amplifiers of the vibration, while wood, held in place by leather, seemed to avoid all difficulty.

Even with the standard as stable as could be arranged while using the sliding-back, the image as recorded on the film was not as clear as had been hoped. In spite of the utmost care by the author and by an expert photographer, who had been developing the film and consequently was very interested in the experiments, image sharpness could not be improved. On the theory that the lens tube of the camera might not be precisely vertical, a focusing technique was devised whereby the lens tube was held perpendicularly by means of a piece of metal and focused by the usual lever. By experiment, a position was found for the lever during the adjustment of the lens tube in order that the camera could be focused in the usual manner when the ground glass of the

back was in place. Carefully each contributing factor was checked; the lenses were all cleaned; the back was set firmly without play; the image was focused with infinite care by means of a magnifier; but the results still lacked perfection.

A "number one" front lens was then tried without the use of the sliding back, and the results were all that could be desired. By a few simple measurements and a plumb bob, the camera could be adjusted much faster than the old method whereby the back had to be moved and the lens focused by hand, and the operator for each adjustment had to mount a chair or box, with all of the problems of gymnastics involved. Possibly the sliding-focusing attachment was faulty, but more probably the precise type of work required was beyond the limitations of that device. Even if equal results were possible, the front lens would have been more convenient.

As an experiment, the author tried an Argus camera, model "AF" which would focus to within 15 inches of an object, making front lenses unnecessary. The results from the Argus were very little different from the best of the Leica performances. While an "f.9" stop was found to be the most practical for the Leica, perhaps an "f.12" would be better for the Argus. However, it was interesting to note that a cheap, American-made camera could be used for such exacting work as the microfilming of documents without the need of expensive attachments.

For the purpose of loading the bulk film on cartridges, an inexpensive "Daylight" loader was a great convenience. Most of the bulk film was obtained in 100-foot rolls, which exactly fitted the loader, while larger amounts were easily used by winding enough film on an empty core to fill the magazine of the loader without crowding. The whole process was no more difficult than filling a single empty cartridge. The loader then could be carried with the camera equipment, and cartridges filled in a few seconds as needed.

Only the ordinary type of cartridge supplied loaded with film by the manufacturer will fit the Daylight Bulk Film Winder; special Leica cartridges are too bulky. Ordinary cartridges, however, can usually be obtained free from most photo shops which is a great financial advantage, for it was found that almost 30 cartridges are necessary for

venient operation, counting those being used and those in the hands of the photographer for development. With a sufficient supply of cartridges, week-ends, fiestas, or "mañanas" can be faced with equanimity and with full knowledge that there will always be enough cartridges on hand. Thirty cartridges of the expensive, special type, could be an unwelcome expense item in most scholars' budgets.

For developing the film, the author made a contract with one of the local photographers, Sr. Atilio Camara. The charge was only 50 centavos, or approximately  $10\frac{1}{2}$  cents per roll. Furthermore, Sr. Camara was sufficiently skilled to rectify minor errors in judgment of exposure time on a roll, when necessary. If desired, now that he is properly acquainted with the process, Sr. Camara will undertake microphotographic commissions, using his own equipment in the institution holding the desired documents, for a fee of about 3 cents per exposure. He is thoroughly honest and reliable.

The light factor was troublesome. Natural light continually changed due to clouds or the angle of the sun's rays. The yellow cast of some documents created a color problem, which constantly required consideration. A yellowed page required considerably more exposure than a white one, and a filter might have been used to good advantage. However, by means of a rheostat and a light meter used about eight inches from the page, reasonably satisfactory adjustments were possible. The two gooseneck lamps, with 100-watt bulbs, proved to be ample for exposures of one second at "f.9." The only difficulty with the lamps was that the diffusion was not completely uniform. By raising the lamps high enough on piles of books, this difficulty was overcome somewhat. Experiments were carried on with other methods of lighting, but there was not sufficient time to develop anything enough better to warrant the additional expense or bulk. Perhaps some use could be made of the new vapor tube lights to obtain a more even exposure.

By working swiftly and efficiently under the limitations of working hours, it was found that about eight rolls could be taken per day as the documents were scattered through many volumes. More could be done on straight copy work, that is to say, working page by page and seldom changing volumes. However, more time had to be spent in

finding the material than in copying it; so 20 to 25 rolls a week was found to be the speed with which the author with the aid of an experienced research assistant, Sra. Maria Castelo de Zavala, could work. Nevertheless, in about five weeks, the project was completed. Approximately 8,000 pages were selected and copied, and no undue haste or late night work was necessary.

The use of cameras, while still a curiosity in Mexico, has at least become sufficiently well known so that each institution has more or less established a routine for the use of such equipment. Thus, there is no need for lengthy explanations or demonstrations, and permission to photograph documents is readily granted. The only requirement of the Archivo General de la Nación is that one must submit a list of what one has photographed to the Historian Sr. Edmundo O'Gorman. The principal institutions, including the Archivo General de la Nación, the Museo Nacional, the Archivo de la Catedral, the Biblioteca Nacional, and the Archivo del Ayuntamiento, are all equipped with electricity, and space can be found for the use of cameras. There are usually sufficient outlets or bulbs nearby which can be used for access to the source of energy. However, three pieces of supplementary equipment should be carried. In the first place, most Mexican outlets are of the round European type, which require a peg plug; so an adapter will be necessary for most American electrical devices. Also, a plug should be carried which can be screwed into lamp sockets in case the outlets are inconveniently placed. Finally, from 15 to 20 feet of extension cord should be obtained in addition to the usual equipment. It would be well, also, to have an ordinary desk lamp, for the personnel of the Archivo General de la Nación believe that electric light is bad for the eyes, and if one is not fortunate enough to be placed near a window, it is almost impossible to work for long over old and faded documents.

The electrical current furnished in Mexico City is the usual 110 volts, but of only 50 cycles instead of the customary 60. Therefore, any electrical timing device will fail to function properly, and special types of clocks and motors are necessary.

Almost any kind of photographic or construction material can be found in Mexico City, and with a little ingenuity, all necessary repairs and alterations on equipment can be made. On the streets leading

to the Zocalo,<sup>1</sup> opposite the National Palace, are most of the photographic shops. Behind the Cathedral are the glass and cardboard shops. On the street behind the Ayuntamiento building are the hardware stores, selling sheet metal, screws, bolts, wire, and similar items. On the same side of the Zocalo, but on the street which, if extended, would run in front of the National Palace, are the leather shops. Electrical shops are located in the same neighborhood as the hardware stores, but on several streets. Small items of common use can always be bought at sidewalk stands around the Zocalo. Carpenter and plumbing shops are scattered throughout the residential districts.

If recourse must be had to a carpenter or plumber, certain things must be remembered. In the first place, all material must be bought in advance, for most shop owners do not have sufficient capital to keep stocks on hand. Great patience has to be exercised with the workmen, and despite drawings, and a fluent command of the Spanish language, it is almost impossible to put an idea over until the job has begun to take on a recognizable form. Also, it should be remembered that the American sense of values does not hold in Mexico. The price of the material on a small job is apt to be more than a full day's pay of a "master" carpenter. So there is no cause for alarm, financially, if a great deal of slow handwork is necessary to make a piece of equipment.<sup>2</sup>

In general, working conditions were found to be very pleasant. The staffs at the various institutions were courteous, intelligent, and helpful. Even though some of the buildings are old, chilly, and badly lighted, the freedom from petty restrictions and the general informality make the search in the Mexican archives a very enjoyable experience.

<sup>1</sup>The principal central square or plaza of Mexico City [ED. NOTE].

<sup>2</sup>It is also essential to make definite arrangements in advance regarding completion date and payment [ED. NOTE].

# The Students Microfilm Reader

—VERNON D. TATE

IN THE Fall of 1939, an advisory group on microphotography to the Committee on Scientific Aids to Learning, composed of Mr. Keyes D. Metcalf, Director, Harvard University Library (Chairman), Professors Ralph D. Bennett and Ernest I. Huntress of Massachusetts Institute of Technology, Dr. Vernon D. Tate of The National Archives, and Dr. Irvin Stewart, Director, Committee on Scientific Aids to Learning (*ex officio*), was requested to consider the possibilities of designing and making available a simple inexpensive microfilm reading machine for the use of the individual scholar. The problem was discussed at length and did not appear insoluble. Several designs were suggested and three models were constructed. Each of these models was thoroughly tested both in the laboratory and in actual use; a set of plans and specifications embodying the final accepted design was prepared for distribution to manufacturers specializing in equipment of this type.

Bids were requested on a substantial number of the machines, with the Committee assuring the manufacturer of a large enough initial sale to warrant placing a relatively low price on the instrument. The response was encouraging, and numerous bids were received. It was decided to authorize the Spencer Lens Company to build a pilot model which, if satisfactory, would be placed in production. Accordingly, the pilot production model was constructed, thoroughly inspected and tested and a contract for a number of these readers was signed. The Spencer Lens Company, moreover, agreed to keep the machine available on the market for a minimum period of two years. Detailed specifications of the machine are as follows:

## DETAILED SPECIFICATIONS OF THE STUDENTS MICROFILM READER

1. *Type of projection reader:* Shielded opaque screen-type reader intended for individual use with strips or short rolls of microfilm.

*Film size accommodated:* 35mm. single or double frame in any placement. Area covered without moving film .9 x .9 inches. Note: 16mm. film also be read although the reader was not specifically designed to accept it.

*Magnification:* 15 diameters.

*Projection head:* The projection head is an integral unit removable from the body. It contains the lamp house, projection aperture plate, and objective; and may be moved manually into position to accommodate placement of material on microfilm. It is furnished complete with 10 feet of cord and plug; a switch is incorporated in the cord. Spring clamps attach the head firmly to the body. If desired, the head alone may be used for wall projection in which case the lamp house cover should be raised slightly to provide better ventilation.

*Light source:* S-11, candelabra, single contact bayonet base, 100 watt, 120 volt alternating or direct current projection lamp, list price 35¢, and life 25 hours. This lamp sometimes known as a "toy projector lamp" is available from camera stores and electric lamp supply houses. The lamp socket is adjustable to allow new bulbs to be aligned on the optical axis if necessary.

*Optical system:* Two condensing lenses made of heat absorbing glass, special projection objective focused at the factory. Focus may be changed by unscrewing the lens clamp with a screw driver. All parts are readily accessible for cleaning.

*Film holder:* A book-type glass film holder, 10 inches long, is provided. Opaque binding for masking out perforations on 35mm. double exposure film is standard equipment. Transparent binding may also be ordered.

*Roll film attachment:* None: A roll film attachment may be provided or as an accessory at extra cost.

*Screen:* The screen, 14 x 15 $\frac{3}{4}$  inches in size, is made of light blue matte surface cardboard. It is inclined at an angle of approximately 13° for easy reading.

*Cabinet:* The cabinet is made of metal with a black instrument rack finish. Its dimensions are as follows:

Over-all height 39 inches  
Width at base 14 inches  
Depth at base 17 inches  
Height of reading port 23 $\frac{1}{2}$  inches  
Width of reading port 12 $\frac{1}{2}$  inches

A carrying handle is provided on the back of the machine for easy portability.

11. *Net weight*: Twenty-two pounds (without roll film attachment).
12. *Shipping weight*: Thirty-two pounds (without roll film attachment).
13. *Moving parts*: None, with the exception of the book-type glass film carrier which must be manually moved into position to read each page.
14. *Manufacturer*: Spencer Lens Company, Buffalo, New York.
15. *Price*: \$32 f.o.b., Buffalo, New York.
16. *Production date*: The first readers of the production lot are expected to be ready early in January 1941.
17. *How to order*: Orders should be placed with the Spencer Lens Company, Buffalo, New York, or with any of its branch offices in the principal cities.

The machine is exceedingly simple to operate. The projection light is turned on and the material appears on the reading screen. In order to read successive pages, the user must move the entire film holder manually to bring the required area into the projection field. The 10 inch book-type film holder will accommodate approximately 12 pages of single frame microfilm or 6 double frame exposures. When the last page has been reached, the glass film holder is removed, opened, and the film is moved into position to read the following sequence of pages. Extract copies of periodical articles and similar data on microfilm can frequently be read without removing the film from the holder. Care must be taken in this operation to prevent damage to the film through scratching or finger marking; in careful hands, however, the film is perfectly safe. Different orientations or placements of documents may be read by turning the projection head. Spring clamps which hold the head firmly in position are released, and the head is turned until the material appears in the desired position on the reading screen. The magnification is fixed at 15 diameters, and the lens is focused at the factory. It may be re-focused if necessary by loosening a screw in the lens clamp. A rugged, inexpensive projection type bulb is used. A spare bulb is mounted in a spring clip in the lamp house. All optical surfaces are readily accessible for cleaning.

Experience has demonstrated that the reader can be used most effectively by placing it slightly lower than the level of a normal desk or

le. A typewriter stand is ideal for this purpose. The projected image of good quality and field tests demonstrate that no unusual eyestrain difficulties were encountered. No claims are made for extreme convenience, beauty, ready-portability, or universality. Emphasis has been placed throughout on suitability for the single purpose for which it is designed, simplicity, and low cost.



FIG. 1.—Students Microfilm Reader,  
Film at Placement II



FIG. 2.—Students Microfilm Reader,  
Film at Placement I or III

The benefits of microphotography in assembling research data of types are well known. Facilities exist in the principal libraries, archives, and other institutions for the reproduction of their holdings. Many individuals have secured equipment and microphotographed

extensive files. The greatest difficulty to date has not been to secure material on microfilm but rather to obtain adequate utilization equipment. In sponsoring the development of a simple inexpensive microfilm reader, the Committee on Scientific Aids to Learning has considered solely the requirements of the individual. Excellent equipment developed primarily for commercial and library use is already available on the market. In most cases, it is entirely satisfactory (except for price) for individual use. The student's reader is not intended to compete with any existing reading equipment. It was developed specifically to permit the individual scholar or scientist to utilize in his own study or laboratory microphotographic copies which he may have made personally or procured from one of the existing sources of supply.

# Microfilming — A Service Business

KARL ADAMS, Jr.

MICROFILMING, like other reproduction processes, is fundamentally a service business. The actual service rendered is the making of complete, perfect and permanent duplicates of original materials. With this basic principle in mind, Graphic Microfilm Service, Inc. (formerly Graphic Service Corporation) initiated its program over four years ago. During these years, research engineers have designed and perfected equipment primarily for the use of the company. This equipment was designed to do every conceivable type of microfilm work, from duplicating X-ray negatives to filming engineering drawings up to 11 inches in width and of any length. As new problems appeared, new equipment was designed until at the present time Graphic Microfilm Service is prepared to render a complete service in the microfilm field. It was to be expected that as equipment was perfected and used commercially, a demand would arise for its rental or outright sale, particularly for reading machines to use with microfilm files. Close association with customers provided an intimate knowledge of operating needs. Equipment perfected for use by Graphic Microfilm Service operators was redesigned for use by customers at their insistent demand. The fact that this equipment had been in constant use by the company was considered sufficient proof of its general suitability, both from the standpoint of ease of operation and ability to stand up under every-day use.

It is still the policy of Graphic Microfilm Service, Inc., to sell or rent only those pieces of equipment which can be used effectively by the customer. Experience has shown that the large automatic cameras, such as the Micro-Multimatic Special, are most efficient when operated by specially trained men. When this is done, all work is guaranteed as to completeness and quality, and the final cost of the project is known

and included in a contract. Only in cases where there is a large and continuous volume of work is there any deviation from this policy.

The following brief description of equipment will illustrate the extent to which this organization has gone to provide a complete microfilm service to its customers.

The Micrograph camera was designed especially for the use of company operators. Simple in outward appearance, it nevertheless incorporates those features essential to accurate microfilming. Most important is micrometer focusing, so accurate that proper focus can be obtained only by test run calibration. When properly calibrated, this camera is absolutely accurate for each reduction, and not merely for an average of several reductions. The new Micrograph camera, now available for sale, will include micrometer focusing, nonperforate film, variable frame advance, daylight loading, and many other features. The camera is so designed that it can be adapted to the particular needs of the individual customer, eliminating expensive features unnecessary in handling his specific problems.

The Micro-Newsreader resulted from repeated requests for a reading machine which would project a full newspaper page at its original size. In spite of many doubts this machine was developed and still remains the only reader on the market which projects the entire newspaper page at its original size. A recently incorporated feature permits an increase in magnification to 28 diameters, for viewing engineering drawings photographed at high reductions.

The Micro-Copy-Reader was designed to meet the demand for a small compact unit to replace a sizable drawing or blueprint room in locations where space was of utmost importance. The requirements for this reader were as follows: (1) Enlargement to half-size of drawings 27 x 40 inches in size; (2) Storage space for approximately 10,000 drawings on microfilm; (3) A screen for making tracings from the projected image; (4) Facilities for making prints rapidly without handling the film; (5) All to be contained in a space approximately two feet square. Not only did the Micro-Copy-Reader meet all these requirements, but produced enough illumination to permit prints to be made on contact photographic paper in the average office or drafting room. These readers are now being used by engineering firms and

government agencies to make their microfilm files quickly available in the form of screen images or paper prints.

The Micro-Scholar-Reader, a low-cost reader for research students, yet has not been put on the market as there is much discussion as to what quality or price the field of research is willing to accept. Until a survey of this field is completed, Graphic Microfilm Service, Inc., is withholding this machine. If there appears to be enough customer demand and interest, the Micro-Scholar-Reader will be put into production without delay.

The Micro-Printer was designed to provide customers with clear, sharp prints from all types of microfilm negatives. This printer has demonstrated its ability during two years of continuous service. Its features incorporate positive contact, control of light through photoelectric cell reading, quick variation of density changes, no blurring from film edges, and easy handling. Although many requests have been received to sell this printer, the company policy previously did not permit the sale of this equipment. Now, however, it is felt that the printer has proved itself, and therefore it will be made available to libraries, institutions and others requiring a machine for their own use.

While demonstrating the Micro-Copy-Reader to large engineering firms and government bureaus, the problem of microfilming long drawings which could not be photographed, except in sections on the ordinary type of microfilm camera, was brought up. Also, the handling of large drawings was so great that the use of microfilm as a medium for preserving all sizes of engineering drawings was impractical. Actual time studies showed that drawings 24 x 36 inches or larger required two men for approximately an hour to film a maximum of 100. This rate could not possibly be maintained throughout the working day. The filming for one customer of a short run of 500 drawings which averaged 27 x 40 inches required the services of three men for a day and a half. The high reductions necessary for large drawings reduced somewhat the clarity with which the microfilm image could be brought back to original size, constituting another objection to this method of microfilming. The reason was that it was necessary to use the whole of the lens even to its outer edges. While center of the image remained sharp, the corners blurred and were out of focus. The

difficulty of securing an even light over a large field was considerable. The problem of making satisfactory prints on paper or cloth at full size was even more difficult. With the ordinary enlarger, to obtain an even distribution of light, some type of diffusing screen between the light and the film was essential. Although diffusion might solve the problem of light distribution, it introduced a complicating factor. Diffused light naturally has a tendency to diffuse the lines on a microfilm negative, thereby giving them a wider spread on the print than they naturally should have.

To meet these objections, Graphic Microfilm Service, Inc., designed and perfected a camera called the Micro-Multimatic-Special, which has made possible microfilming on 35mm. film, with excellent results, at a reduction never before thought possible. Although this machine is designed to take 16mm., 35mm., or 70mm. film, the results have been so satisfactory on 35mm. that it is felt that in the majority of cases, it will not be necessary to use the 70mm. size. It is desirable to avoid the use of 70mm. film as all commercial motion picture and microfilm equipment is designed around either 16mm. or 35mm. film. To standardize on or even to use 70mm. would require new types of projectors, reels, storage equipment, in fact, nearly everything which is gradually becoming standard in the microfilm field.

The Micro-Multimatic-Special is an automatic camera which will handle any type of loose sheet copy up to 42 inches in width, and of any conceivable length without interruption of the image. The camera is extremely economical on film, as a special feeding device permits the filming of more than one sheet simultaneously. For example, on the 42 inch coverage, five 8½ x 11 inch sheets can be photographed, using the same amount of film normally required for two sheets. The length of exposure is determined by the copy itself as it passes over a photoelectric beam. There are no mechanical trips to tear fragile copy. The amount of film used for material of any length is always at a minimum, therefore insuring the greatest possible saving in storage space.

*Focusing.* The camera is of fixed focus type and permits three different reductions. A reduction of 31 times for material between 32 and 42 inches in width; a reduction of 24 times for material between 16 and 32 inches in width; and 12 diameters for material under 16 inches.

Changes of reduction can be quickly made and the density of various copy is controlled by the speed of the bed or variation in light.

*Speed.* In operation, the camera can handle from 400 to 1200 individual sheets per hour, depending upon the size and condition of the material.

*Exposure.* As the camera operates on the principle of a panoramic camera, that is, with the copy moving in one direction and the film in the other, actual exposure takes place through a narrow slit above the lens and over the photographic field. As this slit naturally uses only a cross center section of the lens, it does not use the utmost capacity of the lens in the ordinary camera.

*Illumination.* The photographic field, being a narrow slit, can be illuminated evenly at all times. Through a special roller system and air pressure, the material is held flat while in the photographic field.

*Enlarging.* A high intensity lamp and condenser system for making enlargements is incorporated in the camera. The processed microfilm is substituted for the raw stock and ordinary photostat type paper fed through the bed of the camera where the original material was photographed. The projected image is printed continuously on paper at a rate of speed determined by the sensitivity of the material. Sharp, even prints are assured as the image is projected in the same way that the original negative was taken, and through the same lens system. By using the same lens and reduction, with proper allowance for processing distortion, absolute scale can be obtained. Should a print of reduced size be required, it is necessary to use one of the alternate lens systems.

This camera has been in continuous use for many months on large engineering jobs and has proved conclusively that successful microfilms can be made day after day on all types of material at high production speeds.

The Micro-Multimatic Universal is a smaller camera similar in operation to the Micro-Multimatic Special, with coverages of 20 inches, 15 inches, and 10 inches, at reduction ratios of 16, 12, and 8 times respectively.

An important feature incorporated in this camera is an automatic book cradle which permits bound material to be photographed as readily as loose sheets. The book cradle moves across the photographic

field at the same speed as the loose sheets, and returns immediately to the front of the machine where the page is turned. A book cradle for this type of machine is essential when material of legal importance is microfilmed, for in some cases a microfilm negative cannot be admitted in evidence unless all material is taken in numbered sequence on film without splices. Although the ordinary planetary camera can handle bound and loose materials, it is necessarily much slower for handling the latter than an automatic machine. Therefore, it would not be satisfactory where large quantities of bound and loose material must be photographed in sequence. Proportional focusing, using only the amount of film necessary for any size book or sheet, is incorporated in the camera. Where two-sided copy is to be photographed the operator can return copy to the front of the camera for rapid handling. One-sided cardboard or other thick material can be directed into a hopper at the back of the machine at the discretion of the operator. The Micro-Multimatic Universal also incorporates the same enlarging system notes in the Micro-Multimatic Special. This method allows a complete roll of any section of a roll of microfilm to be exposed on photostat type paper without interruption, thereby facilitating the making of inexpensive and quick enlargements.

Experience in handling all types of microfilm work has shown that the customer is better served when complete responsibility for the finished film lies in the hands of a service organization which can work with the customer and solve his individual problems. Graphic Microfilm Service representatives are competent to estimate any type of material for microfilming, and to quote a fixed price per document, based upon inspection of the material or prior experience with similar work. Microfilm work performed on this basis assures a customer of the final cost and relieves him of all responsibility for the satisfactory completion of the work.

A typical example of the service offered by Graphic Microfilm Service is in the microfilm reproduction of engineering drawings. Most automatic equipment for this purpose is designed for large volume production and few customers have enough work to warrant the purchase of expensive high capacity equipment. It is cheaper and more efficient to film the accumulation of back drawings on a contract basis.

Two methods for keeping up to date on new drawings or changes which necessitate the filming of a small number of drawings per week were offered: First, the purchase of a Micrograph camera specially calibrated for the customer's requirements; supervision in the form of careful examination and checking of all film processed is supplied; second, periodical filming in the customer's plant on a contract basis.

Equipment rental has been considered and rejected, as it is felt that a division of responsibility for the finished product is undesirable. Records show that under the rental system the work is not as satisfactory and the net cost to the customer is usually higher.

Graphic Microfilm Service is also equipped to handle such work as newspapers, books, legal abstracts, X-rays, etc. Currently, negative and positive microfilm copies are being made of approximately 40 foreign newspapers, as well as many local newspapers and periodicals. Facilities are available for making enlargements from microfilm copies in any quantity at prices considerably below those for usual processes of making photographic prints.

Complete information may be obtained by addressing inquiries to Graphic Microfilm Service, Inc., 30 Adams St., Waltham, Mass.

# Facsimile and Documentary Reproduction

— VERNON D. TATE

WITHIN the past decade, documentary reproduction has assumed a position of immense importance in all activities involving records. Mechanical, photomechanical, photographic and other processes have been investigated, tested, and in some cases adopted. Although numerous current methods yield results which a few years ago would have seemed incredible, the search for easier, more adaptable, and, above all, cheaper techniques has continued. Recently, certain developments in the field of communications, which may be grouped loosely under the heading of facsimile processes, have seemed to offer decided advantages for some types of work in documentary reproduction. It is the purpose of this brief paper to enumerate several of these and to survey in a preliminary manner some of the developments now going forward in the research laboratory or experiencing their first baptism of fire in general use.

One of the most important sources of information about this field is the book *Radio Facsimile* edited by Alfred N. Goldsmith, Arthur F. VanDyke, Charles W. Horn, Robert M. Morris, and Lee Galvin, of which volume I was published in October 1938 by RCA Institutes Technical Press. Volume II has not yet appeared. The book bears the subtitle, "An Assemblage of Papers from Engineers of the RCA Laboratories Relating to the Radio Transmission and Recorded Reception of Permanent Images." It is divided into four parts as follows: I. Historical Development of Facsimile; II. Status of Radio Facsimile in 1938; III. Radio Facsimile Communication Methods and Equipment; IV. Radio Facsimile Broadcasting. This important study has been drawn upon freely in the preparation of this paper.

There are three principal developments in telegraphic and radio communication which should be reviewed. These are: printer telegra-

hy, facsimile, and television. In the former, an electric typewriter, or an essentially similar machine, is remotely controlled to produce a text on a page or tape. A machine operating on this principle, known as the Teletype, has been widely used and publicized. Another development, multiple typewriting, features a master typewriter which may be either manually or automatically operated. For automatic operation a master roll, not unlike the roll for an old-fashioned player piano, is used. These machines are widely employed in advertising to produce "personalized" letters on a large scale. The second development, facsimile, is a system of communication remotely operated to reproduce any graphic material, such as printing, typewriting, manuscript, line drawing, halftones and the like. The recorded image may be made permanent. The last development, television, includes the methods whereby moving or fixed objects are transmitted for reception by visual observers, and of which records are not generally made.

The first and last of these may be neglected for the purposes of documentary reproduction. The second, however, may conceivably become of utmost importance. The basis of the facsimile process is a system of scanning which has been described as "a method of analyzing and reassembling a picture by a method similar to that used by a human eye in reading. In other words, the eye follows each horizontal line from left to right, thus gathering information and returns to a starting point at the left side of the page and repeats the process many times to reach the bottom of the page. At present, facsimile involves a relatively slow-speed scanning process which produces a graphic record of a page in a period of several minutes." Without entering into the technicalities of the subject, it is sufficient to state at this time that apparatus capable of achieving the indicated result exists in many forms.

Facsimile was developed and finds its principal use in transferring photographs from one place to another. Many of the photographs reproduced in newspapers and periodicals are transmitted over long distances and appear in print in amazingly brief intervals. Where formerly days even with air mail or weeks without were required to transport photographs of important scenes or events, facsimile reproductions can be obtained in a few hours. Everyone is familiar with the transmission of war news by this method. It is important to consider,

however, two basic factors. First, facsimile is not limited to pictorial materials, but can reproduce anything that is printed, drawn, or written. Important documents have been reproduced in this manner from time to time. In at least one instance, the complete score for a symphony program was transmitted by facsimile from Germany to the United States in time for a performance when the original score, of which no duplicate existed in this country, was misplaced. A clipping from a Honolulu newspaper was transmitted to New York by relay through California in May 1925. Tabular material, which is particularly difficult to transmit by normal telegraphy, is easily transmitted by facsimile. Second, the nature of the process is such that the transmitting and the receiving mechanism need not be located in separate places. As a matter of fact, by combining a receiver and a transmitter, one of the perplexing mechanical problems in facsimile reproduction, notably synchronization of the transmitting and receiving mechanism, is automatically eliminated. Thereby, the cost of the equipment can be substantially reduced.

Essentially, a facsimile unit consists of a transmitting or scanning and a receiving or recording mechanism. The heart of the transmitting mechanism is the scanning element, which breaks an original into dots or a series of impulses. The conventional modern scanner contains the following: an optical system projecting a small spot of light on a picture, a device for collecting the reflected or transmitted light by a photoelectric cell, a mechanical system to bring all parts of the original being scanned under this spot of light in an orderly manner, and an amplifying system to change the output of the photoelectric cell into a usable electric signal. Alternate scanning methods usually require specially prepared or treated originals.

There are four principal receiving or recording systems: photographic, ink, electrolytic, and carbon paper recorders. The photographic recorders use sensitized paper or film, generally wrapped on a drum and exposed by a spot of light which varies in intensity or is modulated by the signals received and reproduces the image as transmitted by the scanner. Several variant methods achieve the same practical result. The ink recording process employs a means to atomize a minute stream of ink and to produce a spot about four or five thousandths of an inch in diameter on paper. The facsimile is built up by a large number of these

iny ink spots. Electrolytic recording is based on the principle that certain chemicals will darken when an electric current is passed through them. A chemically saturated paper scanned by a contact stylus darkens at each impulse or black signal received from the scanner. The sensitizing elements usually employed are quite slow and are comparable to blueprint photographic emulsions. The carbon paper recorder employs a stylus, carbon, and white paper wrapped on a drum. The stylus moves down to contact the carbon paper as signals from the scanner are received. The apparatus is simple, cheap to construct, and the product does not require additional processing as in the case of some of the others.

The first attempts to utilize facsimile duplication in the field of documentary reproduction were stimulated by a desire to utilize low-cost, easily developed, diazo type paper and to print full size catalog cards by projection from microfilm negatives. In 1938, the writer discussed these possibilities with Mr. J. R. Balsley, then of Multazo, Inc., Dr. Ralph D. Bennett of Massachusetts Institute of Technology, then engaged in conducting a survey of microphotography for the Committee on Scientific Aids to Learning, Dr. Leonard A. Sayce, Kings College, University of Durham, Newcastle, England, who was studying documentary reproduction in the United States under a grant received from the Rockefeller Foundation, and Mr. George A. Schwegmann, Jr., of the Library of Congress. A machine was proposed by Mr. Balsley as an adaptation of principles already in common use for facsimile pictures and similar materials. Additional changes were required, however, to adapt the process to the sensitive material to be used. Initially it was planned to prepare full size diazo duplicate cards by enlargement from microfilms. Later it seemed more desirable to scan the original cards themselves in an attempt to reduce the complexity and cost of the machine and to improve the result. Sample cards made with a laboratory machine proved encouraging, and a model was transferred to San Francisco for exhibit at the annual meeting of the American Library Association in 1939. Unfortunately, the model went astray, perhaps on account of labor difficulties, and was not shown. Later in the year, another model, incorporating new ideas, was proposed and work was commenced. However, financial backing to carry this model

to completion together with other difficulties caused the work to be suspended, although some of the mechanisms and processes employed were abstracted, and applied to communications, sound recording, and television. At this point, Electrical Research Products, Inc., a subsidiary of Western Electric Company, became interested and conducted extensive investigations into the commercial possibilities of the system.

At this juncture, it was stated that the principles involved in the process under discussion were technically sound, and that a suitable machine with a capacity of approximately 45 cards per minute could be produced. The cost of the original model was estimated to be in the neighborhood of \$15,000, although subsequent models, if the demand were large enough, could probably be produced for sale at around \$500 each. Their capacity would not be limited to catalog cards, but would be expanded to accept any type of loose sheet up to approximately 9 x 12 inches in size.

The possibilities of facsimile duplication had aroused considerable interest among those particularly concerned with documentary reproduction processes, and Dr. M. L. Raney of the University of Chicago Libraries organized a dinner meeting of technicians and others at the American Library Association's annual meeting in May 1940. Several problems relating to microphotography were considered, but most of the evening was spent in a discussion of facsimile duplication. The machine described in the preceding paragraph was reviewed. Mr. N. C. Vance of the Radio Corporation of America spoke on certain phases of the problem with particular reference to a machine being developed, experimentally, by his company. Another facsimile duplicator, known as the Multifax, which will be described in detail later, was also mentioned.

The turbulent events of the year 1940 have largely overshadowed the development of the facsimile technique in documentary reproduction. Scientists, technicians, and skilled mechanics have, perforce, been directed to other fields of endeavor. Two machines, both intended for scholarly purposes, are under development but practically may be said to exist in a state of suspended animation. One of these, usually referred to as the Balsley machine, has already been outlined. Details of the other under development by the Radio Corporation of America are

not available. In general, the latter is intended to handle copy up to  $1\frac{1}{2} \times 14$  inches in size and the paper employed is chemically impregnated, thus identifying the process as one of the electrolytic recording type. Samples made on a research machine in red, blue, and deep purple, demonstrate suitable legibility of six-point type and the ability to reproduce newsprint, including market quotations as well as full tone originals. The product of the machine appears on a thin, tough paper of good quality.

It is significant that one facsimile machine, the Multifax, developed by the Western Union Telegraph Company, has been completed and placed on the market. In view of the importance of this pioneer commercial venture, a detailed description is included. The Multifax is a percussion type recorder employing a mechanical stylus actuated by a photoelectric scanning beam. Both the scanning and reproducing heads are incorporated in a single machine and operate on a 24 inch

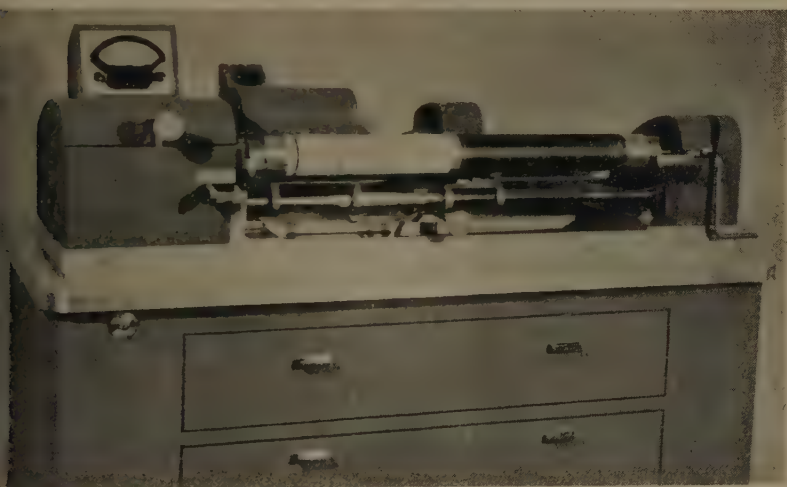


FIG. 1.—Multifax Duplicator

horizontal rotary cylinder or drum about which the original to be scanned and the master sheet to be reproduced are attached. A movable carriage, bearing at one end the scanning system and at the other the percussion unit, travels horizontally the length of the drum so that a light beam traces a pattern over the entire surface of the original and

simultaneously the percussion unit passes over the reproduction sheet. The scanning light, interrupted by black parts of the original, is reflected into a photoelectric cell where it creates corresponding electrical impulses which actuate the percussion unit. As the percussion stylus strikes the reproduction surface, a master copy is created dot by dot. The machine will accept originals up to 11 x 17 inches in size and will reproduce pica and elite typewritten matter and type of similar sizes. In some cases newsprint can be reproduced. Excellent copies of black-and-white line drawings can be made, but photographs or half-tones are beyond the capacity of the machine. A full letter-size sheet  $8\frac{1}{2}$  x 11 inches can be reproduced in approximately 12 minutes. The machine is automatic after the copy and reproduction surfaces are adjusted, and stops automatically as soon as the carriage reaches the end of its travel. Adjustments are provided for variation in thickness or type of paper. At the option of the operator a switch permits positives to be made from blueprints or negatives from black on white originals.

The Multifax which is technically designated as the Western Union Duplicator, 2A, is intended for use as an office duplicator for the reproduction of wax stencils, for the mimeograph, hectograph master sheets, carbon paper duplicates, or metal stencils for the office type offset reproduction. Four types of cylinders or drums are furnished with the machine as follows:

Drum A—for sheets up to 11 x 17 inches.

Drum B—for sheets up to  $8\frac{1}{2}$  x 11 inches.

Drum C—for sheets up to  $5\frac{1}{2}$  x 11 inches.

Drum D—for sheets up to 8 x  $10\frac{1}{2}$  inches.

With drums B, C, D, operating at 90 revolutions per minute, scanning 120 lines per inch, the speed of scanning is  $\frac{3}{4}$  inch per minute. Drum A, which is greater in circumference, operates at 45 revolutions per minute and scans at the rate of  $\frac{3}{8}$  inch per minute. Extra drums of the size most commonly used may be held on a rack on the machine ready for immediate insertion in the machine when the run of the first drum has been completed. In this way, as many as forty-five 8 x  $10\frac{1}{2}$  inch wax stencils may be cut in an 8-hour day. It should be noted that the facsimile process requires no proofreading.

The Multifax machines are available either on a sales or rental basis.

The tentative sale price is \$2,000, which covers installation and instruction of the purchaser's operator. When the machines are sold, however, it is required that the purchaser enter into an agreement for regular servicing for at least the first year at a rate of \$10 per month. This provides for regular inspection and the replacement of minor parts, such as lamps, tubes, etc. On the other hand, the machines may be leased for a minimum period of one year at \$45 per month, which covers installation, training of operators, regular servicing, replacement of minor parts, etc.

Facsimile duplication is not, at the present writing, a method of documentary reproduction which should be widely heralded as revolutionary or immensely important. It is a new field which is slowly being explored and which may conceivably be of great importance in the future. Results achieved with machines such as the Multifax clearly demonstrate the practicability of some types of facsimile utilization. Samples made on experimental and research machines indicate attractive possibilities. All who are interested in documentary reproduction will be interested in facsimile, and the technique may be further developed, perfected, and made available as another useful aid in the reproduction and dissemination of information.

# NEWS and TECHNICAL NOTES

## ACTION COLOR TELEVISUAL PROJECTOR

The newly developed Action Color Televisual projector is a self-contained projector and screen for the continuous and intermittent projection of standard film slides in monochrome or color. It is 20 inches wide by 20 inches high by 15 inches deep, and has a screen size of 14 by 18 inches. The film area covered is that of a standard moving picture single frame; from 40 to 150 frames spliced into a loop may be projected continuously. Longer lengths may be projected a single time, but must be rewound in order to secure continuity before reprojection. A special 100 watt lamp is used in connection with a new type film gate and built-in film cleaning brushes to provide extended projection without damage to the film slide from heat or abrasion. The translucent screen is made of a newly developed plastic and several types intended for color pictures or monochrome are available. The machine is intended for display and similar uses. Further details may be secured from Action-Color Pictures, Inc., 47-02 31st Place, Long Island City, New York.

## THE AMERICAN MUSEUM OF PHOTOGRAPHY

On December 10, 1940, the first museum in America to be devoted solely to photography opened with a private viewing at the American Museum of Photography, 338 South 15th St., Philadelphia. Established under the auspices of the Pennsylvania Arts and Sciences Society, the museum is open to the public regularly on Tuesdays, Thursdays and Saturdays.

The museum is under the direction of Louis Walton Siple, curator, and Margaret L. Brady, assistant curator, assisted by an advisory board composed of a group of America's most celebrated photographers, representing different branches of the profession. Dean of the Board is Caspar W. Briggs, now in his 94th year, whose connection with the profession of photography antedates that of any living American. Mr. Briggs was the greatest of the 19th century lantern slide makers and in 1876 originated the "Dancing Skeleton," the first use of the modern method of motion picture projection. In the field of scientific photography, W. N. Jennings, now in

his 81st year, began in 1882 the series of lightning photographs which won him the Wetherill Medal of the Franklin Institute. Elias Goldensky, one of the greatest camera portraitists of the last 50 years, and Albert Lipp, Sr., inventor of the "Penny Picture," are also members of the museum Board. D. Sargent Bell, son of William Bell, the official photographer on the U. S. Wheeler Survey of 1872, and E. Richard Deats are distinguished commercial photographers likewise on the Board. Representing photo-engraving is Louis R. Benedict, active in this field since before the turn of the century.

The museum has been arranged with rooms containing permanent exhibits of related interests and with a gallery and salon for changing shows. Among the exhibits are to be found examples of the work of Langenheim, Anthony, Brady, Root, Gutejunst, Sarony, Bogardus, Briggs, Bell, Jackson, Savage, Rau, Neff, in fact a majority of the great of American photography. In the room devoted to the magic lantern are displayed the earliest photographic pictures, including the first motion pictures, together with photographic views of American cities used with lantern slide lectures of the early 80s. Among the daguerreotypes are to be seen the first pictures ever taken of Niagara Falls (1845) and a series of an eclipse of the sun (1854). Of unusual interest is a cir-

cular of 1848 giving prices for portraits (photos) on paper. Attractively displayed are the various popular forms of portraits known by our great-grandfathers as melainotypes, tin-types, cartes-de-visite, cabinet portraits and albums of varying styles and elegance. Third dimensional photography is represented with pictures from 1850 and with stereoscopes and graphascopes of modest and pretentious construction. Prominently displayed is a large print of the first photo taken in America from a free balloon (1893). On display in the Gallery is an exhibition of 19th century albumen prints from various parts of the world and in the Salon is a comprehensive exhibition of "Fifty Years of Portraiture," a choice selection of prints made by Elias Goldensky. In this exhibition are to be seen carbon prints, platinum prints, gum prints, tissue paper prints, three color portraits, and a group of prize winning salon prints.



#### THE BETTMAN ARCHIVE

A four page introductory issue of *The Bettman Archive*, a publication devoted to the collection of photographic materials assembled by Mr. O. D. Bettman, appeared in November. Its purpose is to publicize the use of illustrative matter in advertising, direct mail and display as well as for book illustration and jacket

designs. The illustrations reproduced are historical for the most part and were largely microphotographed from old books, manuscripts, paintings and prints. A service for editors consisting of a selected photograph and accompanying 200 word essay is described. A limited supply of these introductory issues is available from The Bettman Archive, 215 E. 57th St., New York City.



#### BIBLIO MICROFILM READER

The Biblio Microfilm Reader was designed to read separate extracts and articles copied from scientific periodicals on short strips of microfilm. It is a projector reduced to its simplest elements and is intended for individual rather than library use.

The image is projected from above on a white viewing screen which is protected from extraneous light by a three sided metal box. A 21 candle power 6 volt automobile headlight lamp is used as the light source, and is operated from an ordinary 110 volt alternating current reduced through a transformer incorporated in the base of the machine. Condensing lenses are so arranged that the film will not be damaged by heat even if left in the machine indefinitely. An objective of photographic quality made by Roussel of Paris is used.

Film is held in the projector approximately 20 inches above the

table and is conveniently accessible for shifting. Two beveled glass discs hold the film in position for projection, and accept the film either in a horizontal or vertical position; thus texts photographed lengthwise or crosswise of the film may be read with equal facility. Magnification is approximately 10 diameters. A fold-



FIG. 1.—Biblio Microfilm Reader

ing leg underneath the base of the machine allows the screen to be tilted to the most suitable angle for easy reading.

This reader is the result of experiments conducted over a number of years by Messrs. Atherton Seidell, J. de Saint Rat and H. L. Flemmer. Four of the assembled machines have been tested for some time under varying conditions with entirely satisfactory results. Unfortunately only enough optical parts for 12 machines were imported from France before the German offensive and additional supplies cannot be secured until the end of hostilities. When conditions permit, production arrangements will probably be made, meanwhile the few available are offered at \$25 each. Orders should be sent to the Medicofilm Service, 7th St. and Independence Ave., Washington, D.C.



#### CHANGE OF ADDRESS

The Graphic Microfilm Service, Inc. (formerly the Graphic Service Corporation, located at 663 Beacon St., Boston) has now moved to larger quarters at 30 Adams St., Waltham, Mass.



#### DAVID HUNTER MILLER DIARY AVAILABLE ON MICROFILM

At the request of the Williams College Library the Columbia University Libraries have put on microfilm David Hunter Miller's *My Diary at the Conference of Paris, with Documents*, which was published privately in 1924 in an edition of

only 40 sets of 21 volumes and one box of maps. This is one of the most important sources for the study of the Paris Peace Conference. Mr. Miller, a leading authority on international law, was appointed special assistant in the Department of State in 1917 and served as legal adviser to the House Mission in 1918. With Sir Cecil Hurst he drew up the first draft of the Covenant of the League of Nations.

The film is 35mm. perforated, 750 feet in length, 5576 exposures, two pages per exposure, suitable for use on the Argus or any standard reading machine. Maps are reproduced in usable form with one exposure for each quarter section.

A price of \$65 for a positive print has been fixed, with the expectation that enough orders will be received to absorb the cost of the negative. Orders for six copies have already been received. Additional orders will be filled as rapidly as possible in the order of their receipt. Address the Director of Libraries, Columbia University, New York City.



#### DU PONT 35MM. MICROCOPY FILM

The Du Pont Film Manufacturing Corporation recently has announced a new film for documentary reproduction. Known as "Microcopy," the film consists of a fully panchromatic emulsion coated on a cellulose acetate (safety) base. It is ultra fine-

grained, has high inherent contrast and an excellent resolving power of the order of 130 to 140 lines per millimeter. The emulsion is coated on an extremely efficient non-halation base.

"Microcopy" is available in the 35mm. width, either perforated or unperforated. It is spooled in bulk lengths of 25, 50, 100 and 1,000 feet (laboratory packing)—on 100 foot daylight loading spools—also in 36 exposure Leica magazines and 27½ foot rolls notched for 5-36 exposure refills. Amateur lengths are available through photographic dealers at a list price of 5¼ cents a foot for bulk lengths, 85 cents for magazines and \$1.80 for notched refills. Professional quantities are sold direct and prices will be furnished on request.

"Microcopy" film should be developed in a positive type developer to bring out fully its high inherent contrast. However, softer results, which are required in some types of copy work, can be obtained by using a negative developer.

A developing formula which has been found particularly suitable for use with "Microcopy" follows:

#### PD-5 Developer

|                                       |            |
|---------------------------------------|------------|
| Water                                 | 700.0 ccs. |
| Rhodol (Metol or Elon)                | 1.5 gms.   |
| Hydroquinone                          | 15.0 gms.  |
| Sod. Sulfite, Anhyd.                  | 60.0 gms.  |
| Potassium Carbonate                   | 64.0 gms.  |
| Potassium Bromide                     | 4.5 gms.   |
| Water to make                         | 1.0 liter  |
| (Dissolve chemicals in order listed.) |            |

Development of "Microcopy" for 3 minutes at 68 degrees F. in developer PD-5 will produce a gamma of about 4.2.

Further information may be obtained by writing to the Du Pont Film Manufacturing Corporation, 9 Rockefeller Plaza, New York City.



#### FROM THE ANNUAL REPORT (1940) OF THE HAYES MEMORIAL LIBRARY, FREMONT, OHIO

The most important dissertations in American history, the social sciences, literature and religion, touching the Hayes era can be published in microfilm at no cost to the author through arrangement with the Hayes Memorial Library and University Microfilms, Ann Arbor. Students who have achieved their doctorate and have no immediate intention of regular publication should get in touch with the Director of Research. Dissertations will be selected on the basis of merit and with the assistance of faculty members of the institutions concerned. Publication by microfilm includes printing an abstract and catalogue cards prepared by the cataloguers of the University of Michigan Library. These are widely distributed and a master negative is kept on file at University Microfilms. Positive copies can be ordered as needed by students at about the price of an inexpensive book. The Foundation will subsidize the pub-

cation of those dissertations which selects, and print a list each year in the Annual Report.

[For a list of microfilms acquired by the Hayes Memorial Library during the year 1940 see the above cited report p.30-31.]



### HIGH RESOLVING SOUND RECORDING FILM

A new 16mm. film, primarily intended for sound recording but potentially valuable for microphotography, has been introduced by the Agfa Ansco Corporation. It is obtainable through the usual sources in standard lengths and may be handled under positive safelights. Any clean working developer producing good contrast may be used; Agfa 20 positive developer is suggested.

The sensitive coating of this film is made by a new process of emulsification which results in an emulsion structure of unusual homogeneity and uniformity of crystal size. This insures clean, sharp resolution of the sound track recorded on the film with a blue-filtered exposing light. In order to prevent deep penetration of the blue light into the sensitive layer, with its accompanying diffusion and halation through intercrystalline reflections, the emulsion is screened with a water-soluble dye. This screening effect fulfills the double function of assisting in cre-

ating a surface image and preventing deep penetration of light into the emulsion layer, even with overexposure.

This principle of obtaining a surface image is similar to that employed in 35mm. motion picture sound recording where "ultra-violet" recording has been adopted to obtain highest quality sound reproduction. Although well suited for 35mm. work, ultra-violet recording technique has not been so successful when applied to 16mm. equipment because of light limiting factors imposed by the ultra-violet filter, smaller optical systems and light valves. Accordingly, the common "positive" type emulsion has been in general use for 16mm. sound recording.



### HOLBROOK MICROFILM PRINTER

The Holbrook Microfilm Printer will accept either 16 or 35mm. perforate or nonperforate microfilm negative regardless of frame size or density, and will reproduce the images as positives with a high degree of fidelity. When operated according to instructions, it is free of slippage, backlash, off tracking, slot image and fogging. Original negative and the print are carefully protected against scratching or other damage. Tests on resolution chart negatives indicate that more than 100 lines per millimeter may be printed on suitable fine grain film.

The printer is a bench type instrument for dark room operation, occupying an area of 32 inches wide by 10½ inches deep by 22 inches high. Film feed and take up are automatic; spindles and driveshaft

uniform speed and printing light intensities on any alternating current 100-120 volt line. The range of printing lights is indicated on a dial numbered from 1 to 20. The lights may be changed for printing nega-

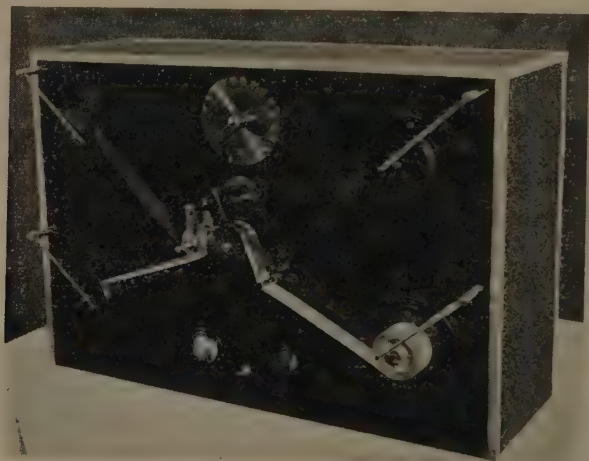


FIG. 2.—Holbrook Microfilm Printer

are mounted in ball bearings and will accept any standard 16 or 35mm. film spools used in microfilming. A core which accommodates standard laboratory packed film in 1000 feet rolls is supplied for the raw stock feed spindle. This avoids the usual accumulation of virtually useless short lengths caused by printing odd lengths of negatives from 100 foot rolls of positive stock. Threading has been simplified by the elimination of all hand operated catches. A rheostat and volt meter control the current supply which may be maintained at 100 volts in order to insure

tives of different densities in 1/10 second, thereby requiring a minimum spacer between density changes on the same roll. The operating speed is 25 feet per minute which is ample negative protection for inexperienced operators. Any operating speed up to 100 feet per minute will be supplied at no extra charge. The instrument panel facing the operator is formica covered, and all exposed parts are chromium plated or optically finished.

The machine is guaranteed against defects in materials or workmanship for a period of two years, and is

priced at \$600 F.O.B. New York. For further information write to Holbrook Microfilms, Inc., 33 W. 60th St., New York City.



# HOLBROOK MICROFILM READER MODEL B

The Holbrook Microfilm Reader Model B is an inexpensive general purpose machine for reading either



FIG. 3.—Holbrook Microfilm Reader Model B

6 or 35mm. microfilm at any placement on perforate or nonperforate stock. A fixed ratio of enlargement of 16 diameters and an opaque shielded screen 14 x 14 inches in size have been incorporated. Books

or manuscripts microfilmed at usual ratios of reduction are shown full size or slightly enlarged. Larger originals or newspapers may be read in sections; any portion of a 35mm. nonperforate film frame may be centered on the reading screen by operating a lever or turning the film wind. The projection head may be rotated to bring any placement on film into the proper reading position.

The reader is provided with two rewinds, one to accept the spool of microfilm to be viewed, and the other fitted with a reel which cannot be removed as a take up. This assures the return of the film being viewed to the cabinet on its own reel and properly rewound for the next user. The fixed spool is partially cut away for easy threading. Retractable pressure plates are used to eliminate scratching, and the pressure plates do not come in contact with the film when the rewinds are operating. A conveniently placed focusing level facilitates the reading of either positive or negative prints with maximum definition. It also allows all portions of wrinkled, creased, dented or badly curled film to be read.

A 50-watt Mazda projection lamp provides ample illumination for easy reading in a normally lighted room. A corrected anastigmat f.2.7 objective lens projects a brilliant distinct image without distortion over the entire screen. The condensing system

is aspheric and corrected to eliminate bluish rings and blotches on the screen. The condensing lens nearest the screen is made of heat absorbing glass, and the film may be left in the projection plane for any length of time without damage. The screen is made of metal finished in flat enamel, and may be washed clean with soap and water when it becomes soiled.

Paper enlargements may be made on the machine by placing a sheet of sensitized paper on the screen and turning the light on and off to make the exposure. Unless the slow "day-light" copying papers are used, this operation must take place in a dark room.

A light weight metal table of convenient height for reading and operating the machine is available as an accessory. The table has two drop leaves which may be used for holding film or making notes. It is mounted on casters which may be locked to prevent motion when the reader is in use.

The price of the Model B reader has not been definitely fixed, but is expected to range between \$50 and \$60. For complete details address Holbrook Microfilms, Inc., 33 W. 60th St., New York City.



#### M.I.T. MICROFILM EXHIBIT

An exhibit showing some of the recent developments in microfilm

equipment, and a few of the many applications of microfilming methods to library, industrial and commercial copying problems was held recently in the Central Library of the Massachusetts Institute of Technology. The exhibit, which was made possible through the cooperation of several manufacturers included microfilm cameras and projectors for both library and individual use, commercial cameras and projection apparatus, a microfilm printer, and a copy-reader designed for industrial use.

More than a thousand visitors attended the exhibit during its four day period from November 19 to November 22. Among those present were many librarians from college, university, and industrial libraries in New England, commercial photographers, representatives of several government bureaus and agencies, industrial engineers, and many others either interested in or directly concerned with the problem of reproducing research materials, drawings, correspondence files and other documents.

The equipment on exhibition included the new Recordak camera and Library projector, the Recordak 16mm. commercial camera and projector and the Recordak Junior (a combination camera and projector), the Boni Readex projector, designed primarily for reading microprint, the Federal Illuminated viewer, the

Polmer Graflex Photorecord camera, the Holbrook Microfilm printer, and the Holbrook reader, a simplified and inexpensive model designed for individual use, the Graphic Service Newsreader and Micro-Copy-Reader. In addition to the apparatus, there were several displays showing the application of microfilm to the copying and preservation of newspaper clippings, large industrial drawings, and business records. Its use as an aid to the publication of research papers and theses was also shown, and represented by *Mathematical Reviews* and *Microfilm Abstracts*. Several special films were prepared, for use in the various projectors, showing many other applications of microfilm to the fields of business, industrial research, library practice and publishing.

The exhibit which was this year under the supervision of the writer, is the second such exhibit to be sponsored by the M.I.T. Library; the first one having been arranged in 1939 by Professor Ralph D. Bennett of the Electrical Engineering Department. Both of these exhibits have done much to expand the interest in and use of microfilm in this region. They have served as a medium through which potential users have had an opportunity to become familiar with the various types of apparatus which are available, and through which current users have learned of new develop-

ments. An opportunity has also been afforded for the discussion of many problems associated with the reproduction, storage, and preservation of all types of documents.—CHARLES R. MILLS.



#### MICROFILM LIBRARY

Those who would visualize the microfilm library of the future are referred to the "Design Decade" number of the *Architectural Forum* (October 1940, vol.73, no.4, 305 *et. seq.*) where Mr. Richard M. Bennett has illustrated and described his concept of the library of the future and its equipment. Small reading machines are to be borrowed for home use; the index is a marvel of microphotographic efficiency; large reading machines are provided for newspapers and encyclopedias. The buildings are airy, spacious and beautiful. In conclusion the writer states: "The perspective shows a microfilm wing of a library—because even the most rabid enthusiast does not believe books are doomed."



#### MICROPHOTOGRAPHY IN THE DRAFT NUMBER DRAWING

With the subtitle "Cameras repeatedly check accuracy in trail from capsule to questionnaire" an interesting account of the lengthy but accurate process of drawing draft lottery numbers in Washington,

D.C., by Harold B. Rodgers, appeared in the *Washington Evening Star* for Wednesday, October 30, 1940.

After the capsule had been drawn the draft number was pasted on a small card approximately the size of a catalog card and announced, the number was entered on a large sheet with 25 spaces, and was then passed across the stage to a Recordak 16mm. camera which photographed the card and the face of a running watch, while the automatic counter on the machine kept the number of the exposure. For further security the card was then photographed a second time on a precisely similar machine. The number was then mounted on a large sheet with space for 250 numbers, and as these large sheets were filled, they were photographed on a third camera, this time on 35mm. film. As there were 36 of these large sheets the entire 35mm. record was less than five feet in length and the camera was used throughout without reloading. The large sheets were then taken to another room where a fourth camera using 35mm. film was used to photograph first six then eight of the sheets; as soon as these were photographed, the film was removed from the camera and sent to a laboratory for processing. A final manual check was made of the numbers and the checked master sheets were sent to National Selective Service headquarters to be checked against

the master 16mm. film. While the large master sheets were made available to the press, the microphotographs of them were processed and sent to the Government Printing Office where enlargements from the films and cuts were made for the printing presses as rapidly as the process allowed in order to produce the facsimiles used by the various draft boards throughout the country.



#### MULTIFAX DUPLICATOR

The Multifax mentioned elsewhere in this issue is a product of the Western Union Telegraph Company and resulted from the development of facsimile telegraphic equipment. It prepares by radio facsimile hectograph master sheets, wax stencils, thin metal sheets for offset reproduction or carbon copies direct from printed matter, ink or pencil manuscript, sketches, drawings, plans, maps, musical scores or blueprints. In operation, a master copy is placed on one end of a cylinder and the copy material on the other. The machine is started by pressing a button and the original is scanned by a beam of light which is reflected to a photoelectric cell; the minute currents of electricity generated by the cell are amplified and operate a magnetically controlled stylus which makes the master copy. A master sheet  $8\frac{1}{2} \times 11$  inches in size may be reproduced in 12 minutes. The ca-

capacity of the machine is 11 x 17 inches. Reductions in size are possible with the equipment.

Further information may be obtained from Mr. F. E. d'Humy, Vice-President in charge of Engineering, 100 Hudson St., New York.



#### A NEW SOLDERING COMPOUND

A special compound for soldering is a new product of the Geko Chemical Company, 286 Fifth Ave., New York. Available in sticks or finely divided metal in a special flux, the features of the material include a low melting point and a self-cleaning element in the flux which renders it unnecessary to clean the metal before soldering. The two surfaces are brought into contact, a small portion of the compound is placed on the spot where the joint is to be made, and heat is applied with an ordinary match, a torch or soldering iron. The joint is almost instantly made and after cleaning is comparable to unions produced by any ordinary method. Several mixtures for various metals are available. The compound is economical to use and very efficient.



#### NOVEX PROJECTOR AND VIEWER

A combination viewer and enlarger for dental readigraphs and 2 x 2 inch color or monochrome lantern slides is now being marketed

by the Novex Corporation. Constructed throughout of moulded bakelite, the Novex measures 14 inches in length by 12 inches in width by 7½ inches in height, and weighs approximately 5 pounds. A projection objective of three inches focal length and a translucent viewing screen seven inches square have been incorporated. Ample ventilation in conjunction with heat glass filters permits lengthy projection without damage from heat. Negative or positive materials are viewed against the translucent screen or slipped into position for projection. A self-aligning carrier is provided for lantern slides. If desired, greater magnification than that provided on the screen may be had by projection on a wall or distant screen. Complete information and a circular describing this machine may be secured from the Novex Corporation, 629 Washington Blvd., Chicago, Ill.



#### PHOTO-COPYING SERVICE IN BUENOS AIRES

The library of the Facultad de Ciencias Exactas, Fisicas y Naturales of the University of Buenos Aires is now equipped to furnish photocopies of materials in its own collections and in others which may be accessible through interlibrary loan. Special order blanks are available on request; Schedule "A" for the use of members of the faculty, and Sched-

ule "B" for all others. Prices for work done on Schedule "B" in Argentine pesos are as follows:

15 x 21cm. negative (white on black)  
30c each copy.

21 x 30cm. negative (white on black)  
60c each copy.

15 x 21cm. positive (black on white)  
60c each copy.

21 x 30cm. positive (black on white)  
\$1.20 each copy.

Minimum charge for a single copy  
from 60c to \$1.80.

Postage charges for the Capital and  
Interior 30c.

Postage charges foreign 50c.

Requests for work from foreign countries should be accompanied by an international postal money order or a banker's exchange check made payable to the Sr. Decano de la Facultad de Ciencias Exactas, Fisicas y Naturales.

The service is operated on a non-profit basis, and requests are filled in the order received. Correspondence should be addressed to the Librarian, Dr. Ernesto Gietz, Casilla del Correo 1766, Buenos Aires, Argentina.

The preliminary steps to expand this service through the inauguration of a microfilming program have already been taken. As soon as the necessary equipment can be procured and installed microfilm duplication will be undertaken. Dr. Gietz is much interested in cooperative microfilming undertakings and at the present time is studying library practice in the United States. He will

welcome correspondence with other interested institutions and individuals.



#### RECENT LEICA EQUIPMENT

E. Leitz, Inc. has recently announced several new pieces of equipment which should interest those using the Leica in documentary reproduction. One of these is a new type *sliding focusing copying attachment* for all types of close-up and copy photography. As distinguished from former models a new camera holding clamp is incorporated which facilitates the removal and replacement of the camera on the stand. A device for aligning the camera on the copying slide is included. The ground glass is provided with a clear calibrated strip for easy focusing, and a bayonet catch allows supplemental magnifiers or a shade to be attached above the ground glass screen. The light shield known as a *focusing shade for copying attachments* is a separate accessory serving to shield the ground glass screen. Another new offering is the *Leitz strip-file*, consisting of a transparent protective jacket or envelope holding six negatives. The jacket is made of relatively thick material which will not curl and has been specially designed for ease in inserting and removing negatives. A filing card for recording data is furnished for each envelope. A wooden box which will accept approximately 150 strips

of six exposures completes the outfit. A polarizing filter in a special mount which allows visual inspection and automatic correct placement on Leica cameras is now marketed as the *Leitz Polarizing filter*. Intended primarily for use with 2 x 2 inch slides but fitted with a magazine for strip film is the new *Desk viewer*. This instrument has a three element achromatic objective in a focusing mount which provides variable magnification. Magnified images are viewed at a distance with both eyes and the field is flat and without color distortion. A rheostat allows variation of light intensity.

Complete details may be secured from E. Leitz, Inc., 730 Fifth Ave., New York.



#### SPECIALIZED MICROFILM SERVICE

A specialized microfilm service for universities, libraries and individuals using microfilms for study, research and general reading has been developed by Mr. Leonard Hacker of New York. Particular emphasis has been placed on material appearing in newspapers and periodicals. From a vast collection of recent newspapers specialized material is collected and microfilmed. Complete collections for several topics are projected. It will be possible, for example, to secure the book

reviews of the year from the *New York Times* or the *New York Herald Tribune* Sunday Magazine Sections.\* Other Sunday features, including rotogravure, drama, foreign news, hobbies, editorial, real estate, finance, sports and comics may be had on order. The product will be a roll or rolls of microfilm containing all the material appearing under a special heading in the Sunday papers for a period of months or a year. A daily classified page service will also be available. The front page with continuations, the editorial page, obituaries, columnist and feature pages, etc., selected from the daily editions will be gathered on separate rolls of microfilm. It is claimed for this service that research workers will not have to peruse thousands of pages of irrelevant material in order to secure data on their special fields.

An extension of the project into the field of clippings is being undertaken. Clippings on various subjects are carefully sorted and bound into scrapbooks which are then unified and filmed. Examples of scrapbook headings include the following: art, archaeology, astronomy, aviation, ethnology, economics, exploration, medicine, poetry, psychology, etc. In connection with this service a number of scrapbooks from newspapers of the early 1920s are now available.

\* A roll of 35mm. positive microfilm prepared by the Recordak Corporation containing the *New York Times* book review section from Jan. 2, 1938 to Dec. 25, 1938, was submitted to the editor for examination.—EDITOR.

These include the famous flight of Charles A. Lindbergh and the complete newspaper account of the Byrd Antarctic Expedition (1928-30) and others.

In addition to the foregoing, a series of highly selected subjects are being compiled from extinct magazines, out-of-print books, rare pamphlets, original photographs and the like. Typical titles include; Chinese civilization, art, catalogs, nineteenth century fashions, the East Indies, Anna Pavlova, etc.

The microfilms have been prepared on 35mm. perforate film by one of the largest microfilm producing companies. Prices are quoted on the basis of footage required by any particular project. Each reel of film is guaranteed to give complete satisfaction. A catalog and description of the various services is in preparation; inquiries should be addressed to Mr. Leonard Hacker, 651 W. 179th St., New York City.



#### TIME DELAY FOR PHOTORECORD CAMERAS

It has been determined that for certain types of work with the Graflex Photorecord a time delay between the advance of the film and the release of the shutter improves the final product. The delay period helps to assure the operator that the film is not in motion or the camera vibrating at the time that the expo-

sure is made. A suitable and easily constructed device which will serve the purpose may be made from a wide mouthed three ounce glass bottle with a tightly fitting rubber stopper provided with two holes. This is taped to the camera holding arm or the supporting bracket. Short lengths of glass tubing are passed through the holes in the stopper and the outlet rubber tubing from the magazine is connected to one glass tube while the input rubber tubing to the shutter is connected to the other. In use air pressure must build up in the bottle to a point where it will trip the shutter thus providing ample time delay. The length of delay may be controlled if desired by altering the volume of the tube with glycerine or mercury. When used with a motor air compressor this device acts as a stabilizer and eliminates double exposures.

—E. B. POWER.



#### USED MICROFILM EQUIPMENT IN DEMAND

The Editor frequently receives inquiries about the availability of used microphotographic equipment of all types, including cameras, processing equipment, wall type projectors, reading machines and the like. Without assuming any responsibility whatever it has been decided to attempt to place prospective buyers and sellers in contact with each other. Ac-

cordingly, those possessing equipment which they wish to sell and those desiring equipment of particular types are invited to communicate with the Editor, Post Office Box 622, Franklin Station, Wash-

ington, D.C. Lists of equipment for sale should be complete with the make, model, number, condition and price of each item. Inquiries should specify type, kind and price range for equipment desired.

# FOREIGN SECTION

## PHOTODUPLICATION AT THE UNIVERSITY LIBRARY<sup>1</sup> (COPENHAGEN, DENMARK)

A. G. Drachmann

(translated by Harold Larsen)<sup>2</sup>

When the new building of the University Library was erected on the old Lammefaelled,<sup>3</sup> there was arranged a photographic room with double doors, light-proof shutters, and running water. It was known that the Library could use photographic equipment, and hoped that at some time it could be secured. This hope has now been fulfilled earlier than expected, as the Society of Younger Physicians, upon the initiative of Professor Kneed Secher, M.D., has placed a modern photoduplication apparatus at the disposal of the Library and of its readers.

The apparatus, which was furnished by the firm, Heinrich & Poulsen, Højbroplads 6, is of German origin. It is a Licophot, Type Ulist, Size A4.

The copying takes place in the

following manner: A sheet of photographic paper with the emulsion side upward is placed on a level glass plate, which is placed on top of the apparatus. The page of the book involved (that is to be copied), is placed in contact with the paper and is exposed at a constant light intensity, always for the same time—twice at twelve seconds each. The clockwork for this purpose and the automatic circuit-breaker are at the left of the apparatus. The paper is developed in two minutes, rinsed, fixed for two minutes and washed for five minutes. It is then dried for a few minutes with the aid of an electric drying oven furnished with the apparatus. It comes out as a negative inverted as in a mirror, white writing on a black background, and it must be recopied before it can be

<sup>1</sup>*Ugeskrift for Læger*, no. 27, July 4, 1940, p.722 *et. seq.*

<sup>2</sup>Mr. A. G. Drachmann is the librarian of the University Library. The translation from the original Danish was prepared by Mr. Harold Larsen of The National Archives, Washington, D. C. [ED. NOTE: This article was bought to the attention of the Editor by Dr. Atherton Seidell who supplied a microfilm copy from the Medicofilm Service and a rough translation.]

<sup>3</sup>A local place name.

used. This is done as follows: The negative is placed with the writing on the upper side upon the white glass cylinder of the apparatus. An electric light meter is attached, and the light intensity is adjusted by means of a button until the indicator of the measuring device shows the correct light intensity. Then the light is extinguished, and a sheet of photographic paper is placed over the negative and fastened firmly with a black shade. It is now lighted for twelve seconds, and since the light intensity is adjusted according to the individual negative, the lighting is always correct. The positive copy is developed, fixed, washed, and dried; it comes out with black writing on a white background, a true and exact copy in the full size of the original. If it is a question not of a double printed page, but of a single printed page of a book, one copying can be saved. The page is placed with the text underneath directly upon the cylinder, the light intensity is adjusted, and photographic paper is laid over the page. There results a negative with writing in white on a black background, like an ordinary photostat copy. It can be used as it is, and costs only half as much.

The apparatus is so easy to operate that anybody after a half hour of instruction can produce good copies with it. The paper is so low in sensitivity that work can take place in subdued daylight, which is a great

convenience.

It is not hard to see what an advantage it is for borrowers in the provinces to be able now to order copies of articles in periodicals in place of having the entire volume forwarded. A short article in a thick volume, for instance a *Wochenschrift*, would not cost much more than the sending of the volume back and forth, and also the copy becomes the property of the borrower. Where it is a matter of tables, bibliographies, and diagrams which one must otherwise laboriously copy, the advantage of personally owning the copy will be considerable also for borrowers within the city, who have already begun to order copies. Finally, there will be the advantage that the entirely new periodicals, which must be exhibited for a month before being loaned out, will also become available for photographing, so that both in the provinces and in Copenhagen, one may sit at home with one's own copy a few days after the number has been published.

For the Library it is a great satisfaction now to be able to help its readers in a new sphere, where formerly it has been forced to resign. Moreover, it is an advantage to be spared a part of the troublesome shipping of large and heavy volumes to the provinces. Even the borrowers who do not directly have use for photocopies, obtain indirectly an advantage in that fewer volumes are

out of the building when borrowers want to use them.

Since it has been shown that the cost of production in the form of time spent is excessively large for small orders, the Library for the time being must retain the right to assemble the orders, so that, until further notice, photographing can be done once each week. With increasing use, the time of delivery will become shorter—a paradoxical phenomenon. The copying is carried out by one of the employees of the Library. Copies may be ordered by mail or by application in person at the Library, as long as it is open.

The size of the sheet is standardized: 29.5 x 20.5 centimeters. If the page of a book is less than half that size, 20.5 x 14.7, the paper is cut; this half format is cheaper than the whole. As examples, it may be cited that *Ugeskrift for Laeger*, *Munchener medizinische Wochenschrift* og *Journal of the American Medical Association* require whole sheets, whereas the *Journal of Biological*

*Chemistry* and *Acta medica Scandinavica* can be copied upon half-sheets. A *Springersh Zeitschrift* will go on half-sheets: an American journal will often require whole ones.

While the text and drawings with lines are always reproduced clearly, one can not because of the hardness of the paper expect good reproductions of photographs. The copies do not lend themselves to reproduction.

The prices are at present according to size, as follows:

20 x 10 Krone 0.70

20 x 14 Krone 0.85

29 x 20 Krone 1.00

For duplicates the price is Krone 0.50

By giving in this way the thought of Professor Secher a concrete existence, the Society has not only benefited its members in the provinces, but it has offered Danish research in medicine and natural science a new technical aid which will bring many scientists a not insignificant relief in their working conditions.

# BIBLIOGRAPHY\*

—RALPH H. CARRUTHERS

ARMY MEDICAL LIBRARY. *Medico-film service of the Army Medical Library: its purposes, plan of operation, together with a list of more than 4000 abbreviated titles of medical periodicals currently received by this library.* Washington, D. C.: Army Medical Library, Sept. 1940. 26p.

*Compte rendu, 18me Congr.* Nancy, 1938. p.703-17. [T]

"Condensed library; A. & C. Boni Figuring on production of micro-print books and projector." *Business Week*, Dec. 9, 1939, p.48, also *Science Digest*, 7 (Feb. 1940) p.93. [G]

CALDER, RITCHIE. "Microfilm." *New Statesman and Nation*, 20 (July 20, 1940) p.59-60. Reply by A. F. Ridley Aug. 10, p.137. [G]

DE BERNARD, LEO. "La poste pendant le siège." *Le Mond Illustré* (Paris), 15 (Jan. 21, 1871) p.42, illus. p.37, 40-41. [H]

CAMPBELL, R. B. "New library research tool [microfilm]." American Association of Petroleum Geologists, *Bulletin*, 23 (Oct. 1939) p.1567-9. [G]

DUVAL, E. "Mode d'envoi et procedés de transcription des telegrammes apportés par pigeon voyageurs." *Le Mond Illustré* (Paris), 15 (Jan. 21, 1871) p.42-43, illus. p.40-41. [H]

CARRUTHERS, RALPH H. "Photography in the library [as a profession]." Institute of Women's Professional Relations, *Proceedings of the Conference on Photography: Profession, Adjunct, Recreation*, Feb. 9, 1940. p.87-90.

FUSSLER, H. H. [Charging books with the aid of microfilm at Gary Public Library] *Library Journal*, 65 (Apr. 15, 1940) p.341. [G]

—[Common tests for residual fixer and hypo] *Library Journal*, 65 (Mar. 1, 1940) p.207, 263. [T]

CLEMENT, L. and RIVIERE, C. *Résultats de le conservation d'acétates de cellulose, de nitroacétates de cellulose et de films de celluloid ou de sûreté après 25 années.* Congres de Chimie Industrielle.

—[Facsimile reproduction by photoelectric processes] *Library Journal*, 65 (Sept. 15, 1940) p.719. [T]

\* The section of Bibliography compiled and edited by Ralph H. Carruthers is a continuing feature of the *Journal* appearing in almost every issue. New readers are referred to previous issues for additional bibliographic data.

- FUSSLER, H. H. [Library of Congress and University of Chicago agreement on filming manuscripts. Brown University mathematical microfilming service] *Library Journal*, 65 (June 15, 1940) p.539. [G]
- [Microfilm storage] *Library Journal*, 65 (May 1, 1940) p.400 [T]
- [Microfilms as evidence; precedent set in Manton case] *Library Journal*, 65 (June 1, 1940) p.491. [G]
- [Papers to be given at Cincinnati conference] *Library Journal*, 65 (May 15, 1940) p.449. [G]
- [Reducing bulk by microfilming] *Library Journal*, 65 (Oct. 1, 1940) p.815. [G]
- [Review of accomplishments and what remains to be done] *Library Journal*, 65 (Feb. 1, 15, 1940) p.115, 155. [G]
- [The S V E reader] *Library Journal*, 65 (Aug. 1940) p.651. [T]
- [Small practical library of microfilming laboratories] *Library Journal*, 65 (Sept. 1, 1940) p.999. [G]
- [Space for filming facilities] *Library Journal*, 65 (Apr. 1, 1940) p.297. [T]
- [Traveling exhibit on microfilm] *Library Journal*, 65 (July 1940) p.551. [G]
- [Use of light filters in microphotography] *Library Journal*, 65 (Jan. 15, 1940) p.43. [T]
- GOLDSMITH, J. N. "Errata and corrigenda." *Association of Special Libraries and Information Bureau*, 16th Conf., Sept. 1939, p.46-49. [G]
- Warning to photographic copying services to include such.
- KILGOUR, FRED. G. "Typography in celluloid." *Christian Science Monitor Magazine*, Sept. 14, 1940, p.8-9. [G]
- LEONARD, ROY S. "A reel and tray developing machine." Society of Motion Picture Engineers, *Journal*, 24 (Feb. 1940) p.168-76. [T]
- Worth considering for microfilm. One to 200 feet at a time.
- LOWENTHAL, M. "Too small to see but not to read; Albert Boni microprint process." *Saturday Review of Literature*, 22 (Sept. 7, 1940) p.11-13. [G]
- LYDENBERG, HARRY M. "New copyright bill; photographic work in libraries." *Library Journal*, 65 (Mar. 1, 1940) p.178. [G]
- MARTIN, H. C. "Method for making black letter titles." *American Photography*, 33 (Oct. 1939) p.794-5. [T]
- "MEDICOFILM service of the Army Medical Library." *Science*, 92 (Sept. 27, 1940) p.280. [G]
- "MICROFILM and photoprint service." *Mathematical Reviews*, v. 1, no. 1 (Jan. 1940), inside front cover. Mathematical articles made available by Brown University.
- "MICROPHOTOGRAPHS and photomicrographs." *Engineering*, 149 (June 7, 1940) p.566. [G]
- NATIONAL Fire Protection Association. "Report of committee on protection of records." *National Fire Protection Association Quar-*

- terly, 33, no. 1, part 2 (July 1939) p.476-81, disc. p.482. [T]
- "NEW A S A committee starts work on standards for libraries." *Industrial Standardization*, 11 (May 1940) p.119-20. [G]  
One of the subcommittees is Photographic Reproduction of Documents.
- REID, J. D. "Microfilm with the 35-millimeter candid camera bibliog" *Science*, n.s., 91 (June 7, 1940) p.555-6. [T]
- SAYCE, L. A. "Microphotography in 1939." Association of Special Libraries and Information Bureau, *Proceedings*, 1939, p.77-83. [GHT]
- SCHOEN, A. "'Ozaphane' film." *Photogrammetric Engineering*, 5 (Jan./Mar. 1939) p.18-20. [T]
- SCHWEGMANN, GEO. A., JR. "Microphotography for educators." *Educational Screen*, 19 (Feb. 1940) p.68-9. [G]
- STENGER, ERICH. *History of photography; its relation to civilization and practice*. Easton, Pa.: Mack Publishing Co., 1939, 204p. Microphotography on p.88-9, 118-20. [H]  
German edition published in Leipzig by Seemann, 1938.
- STOKES, K. M. "Haves and have-nots; buying microfilms and photostats." *Wilson Library Bulletin*, 14 (Mar. 1940) p.504-05. [G]
- PETERS, T. K. "The preservation of history in the crypt of civilization [at Oglethorpe University]." Society of Motion Picture Engineers, *Journal*, 34 (Feb. 1940) p.206-11. [G]
- POWER, EUGENE B. "Microfilm for the scholar." *Michigan Alumnus Quarterly Review*, 46 (Apr. 27, 1940) p.235-41. [G]
- WALTER, FRANK K. "Administrative responsibility for the conservation of printed material." *Library Journal*, 65 (July 1940) p.568-71.  
See page 570 for microfilm.

## BOOK REVIEWS and NOTICES

COPYING TECHNIQUE, comp. by Frank R. Fraprie and Robert H. Morris. Boston, Mass.: American Photographic Publishing Company, 1940. 128p. 6 x 9 inches. illus. cloth, \$1.50.

According to the preface, this book was originally planned as a short treatise in the *Practical Photography* series, and John A. Tennant prepared a compilation based on three numbers of *Photo Miniature* for this purpose. It was felt, however, that space limitations in the series were so great that the treatment would have been excessively abbreviated. Accordingly, the manuscript was completely revised and rewritten by the staff of *American Photography*, and chapters on copying colored originals and the use of ultra-violet and X-ray by Robert H. Morris, of the Fogg Art Museum at Harvard University, were added.

The result of this approach to an absorbingly interesting group of photographic processes has been an exceedingly useful handbook. By definition, such commercial methods as Photostat, Rectigraph, Recordak, blueprint, diazotype and other documentary reproduction methods em-

ploying special machines and sensitive materials were excluded as beyond the scope of the book. Instead, the basic processes for copying with unspecialized equipment are set forth with valuable directions and suggestions for variation in particular cases to meet specific problems.

There are seven chapters, as follows: Equipment, Preparing to Work, Copying Black and White Work, Copying Colored Originals, Use of Infrared, Ultraviolet and X-ray, Specialized Copying, and Microfilm Copying. The work is well illustrated with pictures, line drawings, and diagrams. The treatment is concise and easy to understand. The book is a mine of useful, practical information on all types of copying problems likely to be encountered by the serious amateur and most professionals not making a specialty of this branch of photography.

It should be noted that the discussion of microphotography is brief and revolves about a device for making microfilm copies with a miniature camera and reading them on an ingeniously constructed small reading machine.

It would probably be impossible

to bring together in one book all existing information about copying, for almost every problem is individual. In fact, there has been no previous book devoted to this subject, although many periodical articles or book chapters deal with various phases or aspects of this subject. This first book on copying can be read with profit by anyone interested in documentary reproduction, and is a recommended addition to a working photographic library.

RECORDS & RESEARCH IN ENGINEERING AND INDUSTRIAL SCIENCE, by J. Edwin Holmstrom. London, England: Chapman and Hall, Ltd., 1940. 302p. 5½ x 8½ inches. illus. cloth, 15 shillings.

From war-time England has come this interesting and thought-provoking study of records and research in engineering and industrial science. The scope is well stated in the half title, "a guide to the production, extraction, integrating, storekeeping, circulation and translation of technical knowledge."

The text is divided into nine chapters, which are as follows: The Nature and Methods of Technical Science; Phases in the Application of Science to Practice; Experimental Organizations; Collative Organizations; The Gathering of Ideas from Technical Literature; The Sorting

and Integrating of Ideas; The Expression and Transmission of Ideas; Foreign Languages and Their Translation; and, The Technician as a Person. The first four, dealing with introductory and basic concepts, provide a wealth of specific information about the functioning of applied science in many fields and about research organizations and agencies, while the remaining chapters are addressed primarily to the individual.

The introductory portion of the fifth chapter, which is considered by the author the most valuable in the book, is devoted to a concept of documentation. Too frequently in scientific research, bibliography and writing have been relegated to positions of minor importance as compared to experimentation or laboratory routine. Consequent losses of time and money are incalculable. If the reader obtains nothing more than a realization and appreciation of this essential and neglected phase of research, the hours spent in reading the book will be repaid many times over. Technical literature, abstracting services, libraries and documentary research methods, ranging from note taking to indexing and classification, filing and personal note systems, are discussed. Some will not agree with the ideas expressed; none will deny the utility of system in accumulating, classifying and using documentation. Methods of expressing and transmitting ideas including speaking, writing,

duplicating, microphotographing, printing and publishing are briefly but concisely surveyed. A valuable section deals with foreign languages and technical translating with a selection of specialized dictionaries. Some possibilities of career work in occupations requiring technical training are outlined in the concluding chapter.

In the preface, the aim of the book is stated, "to teach the remarkable and stimulating fact that the whole of knowledge is available for everyone to use." In so far as technology is concerned this aim has been realized. Research students in any field will find some interesting and helpful suggestions. Librarians, particularly those in charge of industrial special libraries, will find the factual data invaluable for reference, although as the book was in press at the outbreak of the war, many of the organizations mentioned have subsequently modified their activities.

In format, the book is attractive and readable. Charts and illustrations are effectively used. A master chart on the end papers, both at the beginning and at the end of the book merits careful study. There is an index and an appendix of abbreviations for engineering qualifications. Many notes and references appear in footnotes and are themselves cross referenced as required, a welcome innovation which should be universally adopted.

TIME EXPOSURE: THE AUTOBIOGRAPHY OF WILLIAM HENRY JACKSON. New York: G. P. Putnam's Sons, 1940. 341p. 5½ x 8½ inches. illus. cloth, \$3.50.

It seems scarcely credible that practically the entire evolution of photography in the United States can be encompassed in the life span of a living artist and photographer. When William Henry Jackson was born in Keesville, New York, on April 4, 1853, Daguerre had disclosed the details of his process barely three and a half years; almost before he could walk a camera purchased by his father for experiment and then discarded was a favorite plaything. A fondness for drawing, painting and sketching brought the embryo photographer at fifteen into contact with his future profession as an artist and retoucher. Significantly enough he was employed not in a Daguerrean studio but in one using wet collodion plates and producing paper prints. Photography as we know it today is the lineal descendent of the wet collodion process. At about the same time a long series of notebooks, journals, and diaries, which form the framework for the narrative and provide so much interesting and quotable detail, were begun; in fact, the writing of this book was started some 80 years ago.

After a year of service in the

Army of the Potomac during the war between the states and a quiet interval in Vermont as an artist and retoucher, Jackson travelled West. The war was over, the trek to the frontier and beyond was in full swing. As one of a colorful horde of explorers, ex-soldiers, miners, immigrants, settlers and traders, Jackson went to Utah by ox drawn wagon as a "bullwhacker," to California, and back to Omaha herding wild ponies. Jackson opened his first studio in Omaha in 1868, and in that frontier community began the now famous collection of photographs of Indians and the frontier. Life in a town, even a frontier town, was not enough, and soon a buggy chassis, fitted out with a developing tank and all of the cumbersome impedimenta of a wet plate photographer, carried photography into the field. Later photographs and the recently popularized stereophotographs were made along the route of the newly completed Union Pacific railroad to the West.

In 1870 came an historic meeting. Hayden, the great geologist and government explorer, invited Jackson to accompany him for a summer's work. Although expenses were paid, no salary was offered and the inducements were backbreaking work in new and unexplored territory and the opportunity of making a contribution to science. Jackson went. He states: "For Dr. Hayden and the

veterans it was more or less routine, and nothing of striking value was unearthed. But for me the expedition was priceless—it gave me a career." As a permanent and salaried member of Dr. Hayden's staff, Jackson's work for the next eight years is unrivalled in the photographic documentation of the history of the West. Headquarters were shifted to Washington; the Omaha studio was sold; summers were spent in the field, winters in printing and finishing one summer's work and preparing for the next.

The brief limits of a review cannot pretend to do more than outline some of these achievements. What words could do justice to the magnificent photographic recording of the fabulous Yellowstone of which no photographs had previously been published? Some of these remain unsurpassed even at the present time. The thousands who annually visit this first of National Parks should pay tribute to photography and the artistry of a superb photographer for the concrete evidence which finally moved a sceptical Congress to set aside this natural marvel perpetually for the enjoyment of all men. Another expedition to Yellowstone included the Grand Teton range, and the Rocky mountains culminating in a series of views of the Mountain of the Holy Cross. The trail then led into the great Southwest to Mesa Verde recording

cliff dwellings, topography and Indians, with each season adding more and more material to the growing fund of pictorial information about the interior of America. Dry films were becoming known and by reason of the great saving in space and weight, Jackson adopted them for his expedition of 1877 with disastrous results. Of 400 exposures, not one could be developed into a negative. The summer of 1878 was the last of the old survey and when Congress, the following year, made no provision for photography, Jackson returned to the West and from headquarters in Denver made photographic tours to every part of the nation, Mexico and Canada. The scope of action widened even further, and 1894 and 1895 found him the official photographer of the World's Transportation Commission

on a grand tour of Europe, Africa, Australia and the East. From 1900 onward the story draws to a close, and is told in lesser detail. These later years are studded with fruitless attempts to retire and always with continued work. In 1935 at 92 he painted a series of four murals for the new Department of the Interior building. At 98 Mr. Jackson is still making pictures.

*Time Exposure* is an extraordinary book about an extraordinary man. Written with humor and pithy anecdotes it is both invigorating and mellow. The illustrations from the author's own photographs and sketches are all good, some are famous. Many men have lived as long as Mr. Jackson; few have enjoyed life so much, and fewer still have written of their lives so engagingly and well.

# PATENT SECTION\*

U.S. 1,444,469, Feb. 6, 1923, Gustav Kögel and Heinrich Neuenhaus assigned to Kalle & Co., Biebrich-on-the-Rhine, Germany.

Process (diaz) for the production of a light sensitive film on a suitable carrier, for copying and the reproduction of pictures. 3p. no pl.

U.S. 1,753,708, April 8, 1930, Edouard Erhardt Erich Lehmann, Eilenburg, Germany.

Process (diaz) for producing photographic images on layers containing substances sensitive to light. 2p. no pl.

U.S. 1,756,400, April 29, 1930, Maximilian Paul Schmidt and Wilhelm Krieger assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Process (diaz) relating to light sensitive films and layers and their manufacture. 3p. no pl.

U.S. 1,758,572, May 13, 1930, Friedrich Lierg, Vienna, Austria.

Process (diaz) for producing pictures photographically with light sensitive dyes. 4p. no pl.

U.S. 1,758,676, May 13, 1930, Maximilian Paul Schmidt and Wilhelm Krieger assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Process (diaz) for the preparation of light sensitive layers by means of diazo

compounds. Refers to U.S. 1,444,469 and 1,628,279. 2p. no pl.

U.S. 1,760,780, May 27, 1930, Maximilian Paul Schmidt and Wilhelm Krieger assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Light sensitive layers (diaz) and process of preparing them. Refers to six German patents. 3p. no pl.

U.S. 1,762,033, June 3, 1930, Maximilian Paul Schmidt, Rudolf Zahn and Wilhelm Krieger assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Preparation of pictures to be produced by the action of tanning substances (diaz). 4p. no pl.

U.S. 1,770,352, July 8, 1930, Humphrey Desmond Murray, South Kensington, London, England, one-half assigned to Norton and Gregory, Ltd., London, England.

Improvements in the production of photographic images by the diazo-type process and the manufacture of improved sensitive papers. 3p. 1pl.

U.S. 1,803,906, May 5, 1931, Wilhelm Krieger and Rudolf Zahn assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Stabilization of diazo-types. 2p. no pl.

\*The Patent Section is made possible through a grant received from the Committee on Scientific Aids to Learning. The listings include the patent number, date of issue, patentee and assignee (if available), a brief description of the published purpose or title of the patent and an indication of its size; for example, 4p. means 4 pages; 4pl. means 4 plates of accompanying drawings.

U.S. 1,811,029, June 23, 1931, Maximilian Paul Schmidt and Walter Spietschka assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Process of preparing light sensitive layers by means of diazo compounds. 2p. no pl.

U.S. 1,821,306, Sept. 1, 1931, Albert Karl Gotthelf Hingst assigned to Frans van der Grinten, Vendo, Netherlands.

Process of developing diazo and other photographic materials. 3p. 1pl.

U.S. 1,837,639, Dec. 22, 1931, Maximilian Paul Schmidt and Karl Hesser assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Process for the development of diazo types. 2p. no pl.

U.S. 1,845,989, Feb. 16, 1932, Maximilian Paul Schmidt and Rudolf Zahn assigned to Kalle & Co., Weisbaden-Biebrich, Germany.

Light sensitive layers (diazo) and processes of preparing them. 3p. no pl.

U.S. 2,153,810, April 11, 1939, Raymond C. Mercer, Los Angeles, California.

Special film rack and handling apparatus for processing long lengths of narrow film. 4p. 2pl.

U.S. 2,153,376, April 4, 1939, Hayden B. Kline assigned to Industrial Rayon Corporation, Cleveland, Ohio.

Continuous processing machine for motion picture film consisting of a number of large helical driven drums immersed in the necessary solution. 5p. 3pl.

U.S. 2,155,511, April 25, 1939, Luther G. Simjian, New Haven, Conn.

Machine for the automatic developing of photographic prints. 4p. 4pl.

U.S. 2,157,128, May 9, 1939, Samuel Hershberg, Brooklyn, New York.

Continuous processing machine for sheet or strip film. 9p. 5pl.

U.S. 2,163,451, June 20, 1939, Edward B. Sabel assigned to the Haloid Company, Rochester, New York.

A copyholder for photocopy machines consisting of a large board with clamps for holding a number of sheets, forms or cards. 2p. 2pl.

U.S. 2,163,776, June 27, 1939, Ira B. Current and William Henrikson by mesne assignment to Agfa Ansco Corporation, Binghamton, New York.

Copying camera for transferring data from one card to another. Entire data or selections may be copied. 3p. 2pl.

U.S. 2,165,418, July 11, 1939, Alvin E. Schubert assigned to Eastman Kodak Company, Rochester, New York.

Reversing attachment for documentary copying cameras of the rotary type so that both sides of a document may be photographed automatically. 8p. 2pl.

U.S. 2,166,419, July 18, 1939, John Hugh O'Neill, Arlington, Va.

Portable automatic microphotographic camera electrically operated. 6p. 5pl.

U.S. 2,169,010, Aug. 8, 1939, Walter D. Teague and D'Arcy A. Young, Jr., assigned to Eastman Kodak Company, Rochester, New York.

Still projector intended for 35mm. or miniature transparency positives. 4p. 1pl.

# EDITOR'S CORNER

## *The Writers*

DR. L. BENDIKSON, one of the Associate Editors of the JOURNAL, is in charge of the Department of Photographic Reproduction of the Huntington Library, San Marino, California. DR. M. LLEWELLYN RANEY is Librarian, University of Chicago Libraries. MISS MARGARET F. PARMELEE is one of four Senior Catalogers, University of Michigan Libraries, and, is in charge of the cataloging of microfilms of Early English Books at that institution. MR. XENOPHON P. SMITH is associated with Oregon State College. His survey was prepared in connection with a dissertation. MR. JOHN T. WORTH is in charge of the microphotographic work of the Louisville Public Library. In cooperation with the Work Projects Administration, he is initiating a program of large scale newspaper reproduction which will be described in a later number of the JOURNAL. DR. CHESTER L. GUTHRIE is an Assistant Classifier, The National Archives. MR. VERNON D. TATE, Editor of the JOURNAL, is also Chief, Division of Photographic Archives and Research, The National Archives.

MR. KARL ADAMS, JR., is President, Graphic Microfilm Service, Inc. DR. A. G. DRACHMANN is Librarian of the University Library, Copenhagen, Denmark. The translator of his article, MR. HAROLD LARSEN, is an Assistant Archivist, Division of Interior Department Archives, The National Archives. MR. RALPH H. CARRUTHERS, an Associate Editor of the JOURNAL, is Assistant in Charge of Photographic Service, the New York Public Library.

## *The Third Year*

With this number the JOURNAL passes its third anniversary. During this time an attempt has been made to develop in the JOURNAL a suitable vehicle for the exchange of ideas, the discussion of problems and the dissemination of information about documentary reproduction and particularly microphotography. The measure of success which has been attained is a tribute to the cooperation of archivists, librarians, manufacturers, scientists, scholars, technicians and others interested in the many diverse aspects of a rapidly growing field. The JOURNAL will continue to serve, and at this time

the Editors and members of the American Library Association's Committee on Photographic Reproduction of Library Materials wish to extend thanks to contributors and others for invaluable assistance. Particular appreciation is due the American Library Association, for although the names of Mr. E. O. Fontaine, Mr. Harold English and Mr. Harold Laskey of the Publishing Department rarely appear in these pages, they handle the burdensome details connected with seeing the JOURNAL through the press and caring for the subscription list.

In the year 1940 microphotography definitely extended its scope of activity. The Federal Government, business and industry undertook projects of a magnitude which would have seemed fantastic a few years ago. When it is realized that a single project, and not the largest under way in 1940, will require before completion an expenditure of approximately \$500,000 *for materials alone*, the scale of operations becomes evident. Microphotography has come to play an important role in National Defense. A Federal law discussed elsewhere in this issue has defined the legal status of microfilms of government records. In academic and scholarly circles a steady and extensive growth has been reported. Additional production and utilization equipment was provided in libraries, universities, archival estab-

lishments and other institutions. Demands on existing facilities increased, extending to several hundred per cent in numerous instances. Efforts destined to bear fruit in 1941 were initiated to preserve and make available through microphotography some of the menaced treasures of European libraries, archives and other institutions. Individual scholars in ever increasing numbers are turning to the use of microfilm in their research projects.

There have been great advances in equipment and supplies commensurate with the growing importance of the technique. Several greatly improved new cameras have come on the market. Those of the Recordak Corporation and of Graphic Microfilm Service, Inc., are noteworthy. In addition to the special film emulsions for negative making and positive printing manufactured by the Agfa Ansco Corporation and the Eastman Kodak Company, the DuPont Corporation has placed a new negative emulsion on the market. Several new microfilm printers, constructed by Oscar B. Depue, Holbrook Microfilms, Inc., and Graphic Microfilm Service, Inc., have been purchased by institutional laboratories. The reading machine situation, long a bottleneck in microphotography, is now much more encouraging. Reading machines for newspapers and large originals were available previously; their distribu-

tion has increased. Stimulated by the efforts of the Committee on Scientific Aids to Learning to develop an inexpensive reading machine, several manufacturers have announced or placed on the market adequate reading machines selling from \$25 to \$60. These include the Holbrook reading machine, Model B, now available; the Seidell Biblio Microfilm reader, now available; the Society for Visual Education reader, announced for February 1941; and the Students reader, announced for March 1, 1941. The year also marked the suspension of production of the well known Argus reader which will probably be replaced by a redesigned instrument to be announced later.

In all, the year 1940 for the JOURNAL and for documentary reproduction generally, was memorable.

#### *Federal Law on Microphotography*

On September 24, 1940, Congress approved "An Act to provide for the disposition of certain photographed records of the United States Government, and for other purposes." (Public No. 788—76th Congress—Chapter 727—3d Session—H.R. 10026.) The text of this law is as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That whenever any agency of the United States Government shall have photographed or microphotographed all or any part of the records kept by or in the

agency in a manner and on film that complies with the minimum standards of quality approved for permanent photographic records by the National Bureau of Standards, and whenever such photographs or microphotographs shall be placed in conveniently accessible files and provision made for preserving, examining, and using the same, the head of such agency may, with the approval of the Archivist of the United States, cause the original records from which the photographs or microphotographs have been made or any part thereof to be disposed of according to methods prescribed by law, provided records of the same specific kind in the particular agency have been previously authorized for disposition by Congress.

Sec. 2. Photographs or microphotographs of any record photographed or microphotographed as herein provided shall have the same force and effect as the originals thereof would have had, and shall be treated as originals for the purpose of their admissibility in evidence. Duly certified or authenticated copies of such photographs or microphotographs shall be admitted in evidence equally with the original photographs or microphotographs.

Approved, September 24, 1940.

It is difficult to appreciate the present and future implications of this brief but potent legislation. For several years the Federal Government has employed microphotography in the reproduction of records for various purposes. Pioneered by The National Archives, the Library of Congress, and the Bureau of the

Census, the technique has been adopted by 17 departments, agencies, and independent establishments. Projects of great magnitude have evolved. Mention need only be made of the two sets of applications for account numbers microfilmed by the Social Security Board totaling more than 90 million exposures or the reproduction of census schedules and related records from the Census of 1840 to that of 1910 which is now in progress to indicate the extent of present operations. Projects which dwarf even these tremendous undertakings are now beginning. The Works Projects Administration's filming of C.W.A. and other records and the World War draft registration records are examples. Jobs totaling a million exposures are now commonplace.

In the past when large scale microphotographic projects were under consideration two questions were invariably raised, namely: Could records be destroyed after filming? What was the legal status of microphotographic reproductions? In the course of the large scale application of microphotography to private business and industry, a considerable body of legal precedent on the destruction of records and the admission of microphotographs in evidence has been established. One of the most important decisions was that rendered in the so-called Manton case (see *The New York Law Jour-*

*nal*, Dec. 5, 1939) upholding the legality of microfilm records. Several States have enacted statutes governing microphotographic reproduction.

The present legislation represents the initiation of an orderly program for the integration of the technique of microphotography on any scale into governmental procedure. It is not expected that all records which have been microphotographed will be destroyed. The act provides specifically that

the head of such agency may, with the approval of the Archivist of the United States, cause the original records from which the photographs or microphotographs have been made or any part thereof to be disposed of according to methods prescribed by law, provided records of the same specific kind in the particular agency have been previously authorized for disposition by Congress.

Thus it is apparent that the act is intended to facilitate the disposition of so-called useless papers and in no way to encourage the destruction of records of permanent or intrinsic value. Probably the greatest application of microphotography in the Federal Government will be in the reproduction and subsequent disposal of the so-called marginal records of real or potential informational value. Examples are filled in forms, statistical tables, record minutiae, etc.

Section 2 of the act clearly out-

lines the legal position of records microphotographed in terms of the provisions of the act as a whole. As a precedent and guide for uniform State legislation, it is of the utmost importance.

Certain questions remain to be answered. The minimum standards of quality for permanent photographic records must be enunciated by the National Bureau of Standards. The determination of what constitutes conveniently accessible files and suitable measures for the preservation and use of microphotographic records must also be made. These, however, are relatively minor matters which, together with pro-

cedural matters, will develop in the course of regular operations. From the standpoint of the gigantic record problem of the Federal Government and from that of microphotography, the act is a milestone of progress.

### *Annual Index and Title Page*

In accordance with the conventional practice of past years, an annual title page and a comprehensive index follow immediately after the Editor's Corner. The annual title page should be removed and placed before the first issue for the year when volume III is bound.



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A QUARTERLY REVIEW OF THE APPLICATION  
OF PHOTOGRAPHY AND ALLIED TECHNIQUES  
TO LIBRARY, MUSEUM AND ARCHIVAL SERVICE

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